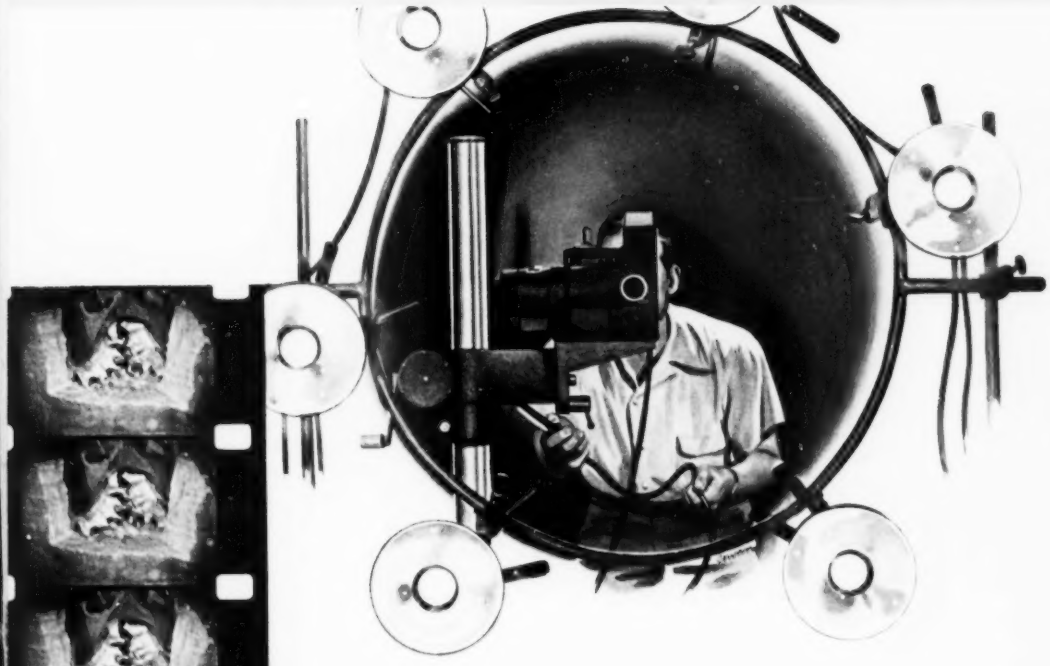
the OIL AND GAS JOURNAL



HUGHES
TOOL COMPANY
HOUSTON, TEXAS
WORLD STANDARD
OF THE INDUSTRY

## BIT ACTION IN *SLOW MOTION*

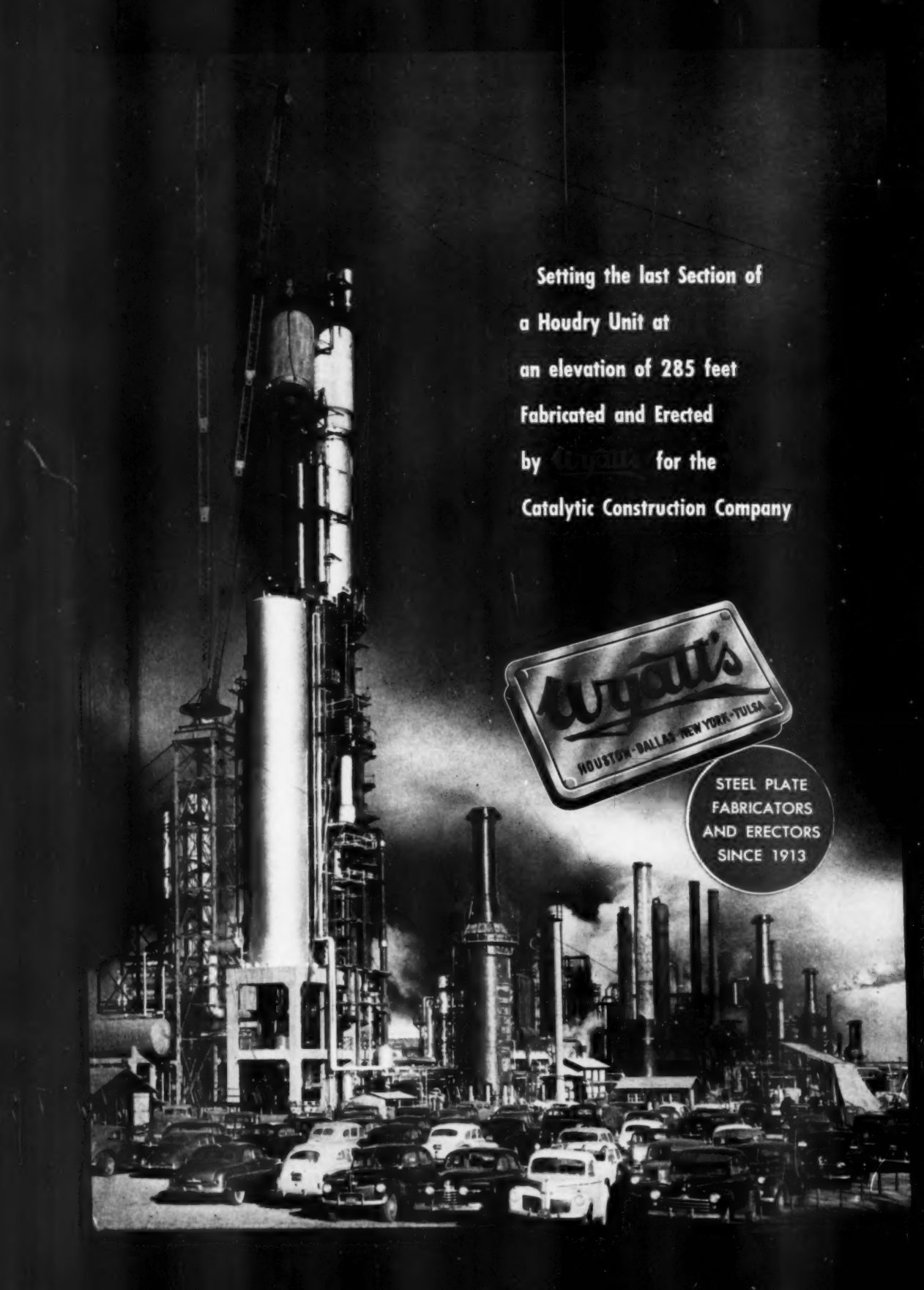
Motion pictures, taken at 3000 frames per second—*100 feet in two seconds*—are being used to study bit performance at the Hughes research laboratory.

Focused on a bit drilling in a test block, the high speed camera records, in slowest of slow motion, how the teeth bite into the formation; shows effect of tooth structure, tooth spacing and other design features on drilling efficiency.

Details, impossible to see with the naked eye, become crystal clear when the high speed film is projected on the screen.

This is only one of the many modern tools used by Hughes research engineers in studying rock bit performance. Supplemented by data obtained from millions of bits run on thousands of rigs, this research enables Hughes to design and build the industry's best rock bits.

PRICE 50 CENTS TABLE OF CONTENTS PAGE 51 AUGUST 9, 1951


Setting the last Section of
a Houdry Unit at
an elevation of 285 feet
Fabricated and Erected
by Wyatt's for the
Catalytic Construction Company
Wyatt's
HOUSTON · DALLAS · NEW YORK · TULSA
STEEL PLATE
FABRICATORS
AND ERECTORS
SINCE 1913

Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

Fittings of steel, iron, and bronze are also manufactured in all conventional types and sizes.

**WALWORTH**

**valves and fittings**

**60 East 42nd Street, New York 17, N. Y.**

Distributors in principal centers throughout the world

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.

# ..born in a whirl!

Literally "born in a whirl" are the Copperspun rotors of Fairbanks-Morse squirrel cage induction motors. These rotors are centrifugally cast of copper—and represent many successful years of laboratory search for new manufacturing techniques in utilizing copper, the ideal rotor metal, for this all-important motor component.

Copperspun rotors are truly one piece, practically indestructible. As opposed to rotors made by other processes and of metals such as aluminum, they combine better electrical and thermal characteristics. They are denser and more uniform. They are accurately machine finished and dynamically balanced for trouble-free service.

They make it more than worth your while, when buying motors, to get in touch with . . . Fairbanks, Morse & Co., Chicago 5, Ill.

**Long life, stamina and high efficiency —that's what Copperspun rotors make possible in Fairbanks-Morse polyphase squirrel cage induction motors.**

## FAIRBANKS-MORSE,

***a name worth remembering***

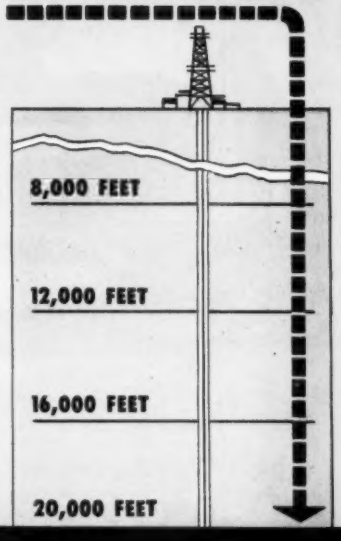
ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • MAGNETOS • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY

*A Few Hundred Barrels of*

# THICK MUD

*can mean a MILE or MORE of*

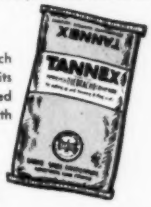
## TROUBLE STRAIGHT DOWN




It doesn't take an awful lot of mud—thick mud—to breed trouble anywhere down the hole. Every driller knows what grief it can bring him—stuck pipe, gas-cutting, swabbing, entrained sand, even a blowout. That's why careful operators keep a hawk-like eye on viscosity and gel strengths—and why these careful operators use these Baroid mud thinners to handle a wide variety of mud thinning problems.

### CARBONOX

An organic mud thinner which resists salt contamination and works well in either normal or high-pH muds. Will not lump, cake or deteriorate in storage. Used for the same purposes as quebracho, and in the same manner, except that it requires less caustic soda.




### TANNEX

An improved quebracho compound which will not lump, cake, harden or lose its efficiency in storage. Tannex is used exactly like ordinary quebracho, with the same amount of caustic soda.

### TANNEX RED MUD CONDITIONER NO. 11

A liquid alkaline-tannate mud conditioner, applicable whenever tannin-caustic mixtures are used. Each gallon contains the equivalent of 4 pounds of dry Tannex and 4 pounds of dry caustic soda. Mixes readily with either hot or cold water. Easier and safer to handle than dry chemicals, and provides accurate measure of chemical quantities.

### BAROFOS

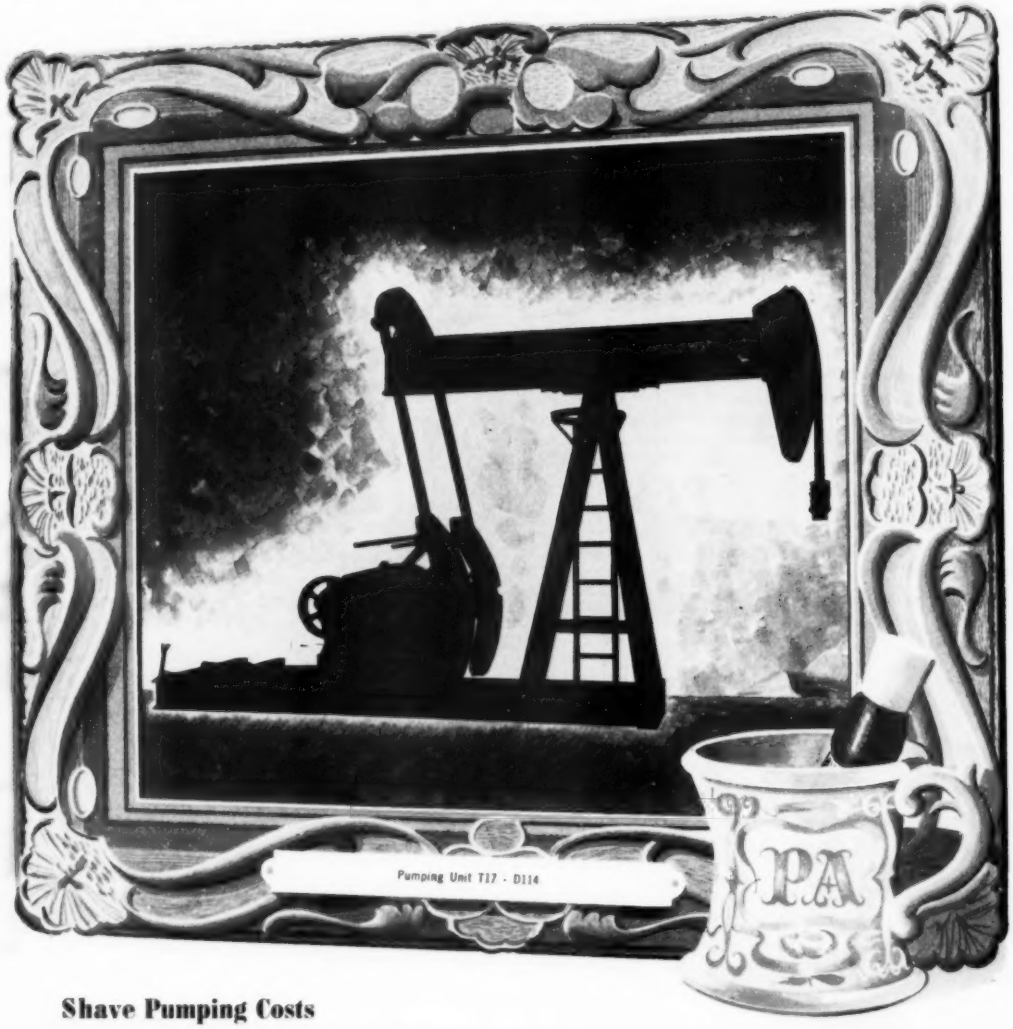
Baroid's own brand of sodium tetraphosphate, the most generally applicable of the polyphosphate thinners. Manufactured to Baroid's own specifications to insure high quality, and packed in polyethylene-lined bags for maximum protection from moisture. Available now.

# Baroid

**SALES DIVISION**
**NATIONAL LEAD COMPANY**
LOS ANGELES 12 • TULSA 3 • HOUSTON 2

**COMPLETE DRILLING MUD SERVICE**

*Great* AMERICANS




**Shave Pumping Costs**

**with AMERICAN Pumping Units**

Available in a complete range of sizes to meet every pumping requirement economically. Write for Catalog 151. Contact your favorite supply store or the nearest American office.

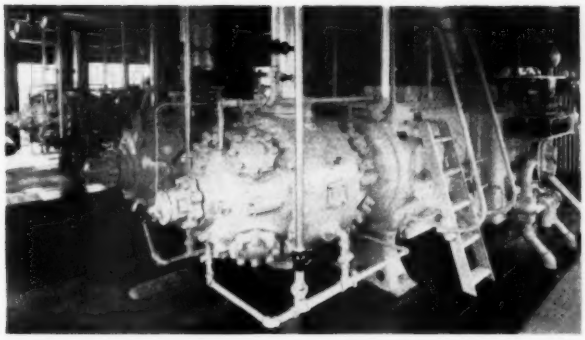
AMERICAN MANUFACTURING COMPANY OF TEXAS

Branch offices:
Houston, Texas, 320 West Bldg., Ph. Ch. 4-3301
Tulsa, Okla., 1506 Hunt Building, Phone 4-8785
Kilgore, Texas, P. O. Box 222, Phone 2338
Odessa, Texas, P. O. Box 983, Phone 3472
New York, N. Y., 500 Fifth Ave., Ph. LA. 4-1857

FORT WORTH 1, TEXAS PHONE VALLEY 2301

# UNIVERSAL VERSATILITY

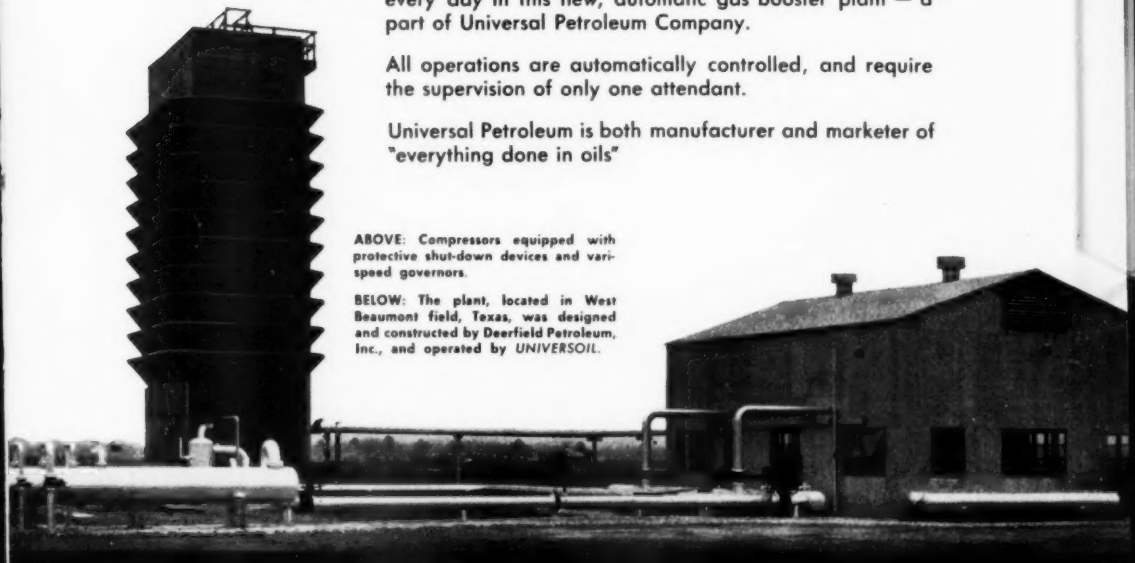
## *One man* AUTOMATIC GAS BOOSTER PLANT



**4,800,000 CUBIC FEET** of natural gas are being utilized every day in this new, automatic gas booster plant — a part of Universal Petroleum Company.

All operations are automatically controlled, and require the supervision of only one attendant.

Universal Petroleum is both manufacturer and marketer of "everything done in oils"



ABOVE: Compressors equipped with protective shut-down devices and vari-speed governors.

BELOW: The plant, located in West Beaumont field, Texas, was designed and constructed by Deerfield Petroleum, Inc., and operated by *UNIVERSOIL*.

# UNIVERSAL PETROLEUM COMPANY

*Producers and Marketers of Petroleum Products*

NATIONAL BANK OF TULSA BLDG., TULSA, OKLA. Cable: UNIFUELS

UNIGAS UNIFUELS UNITHERM

Originators of UNIPLAN

# Mechanical soldiers need good shoes, too!

THESE are days of grave concerns . . . of conservation and mobilization for strengthening the nation's defense—for the survival of our national economy—for the exploitation of the vast oil resources which are the lifeblood of our productive way of life—for the keeping of every home-front machine in condition to stay on the job until its replacement again becomes a normal procedure.

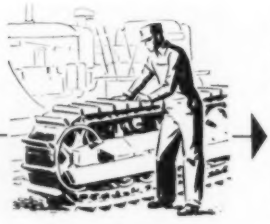
That includes *your* equipment and emphasizes *your* responsibilities. To benefit fully from the productive life that has been built into your "Caterpillar" equipment, you must be alert to its needs as time and hard usage take their toll in wear and depreciation. For instance:

***How are your "Caterpillar" track shoes?***

Tough as they are, they can't battle rocks, shale, jolts and grinds forever. Growing shortages in the premium steels that go into them may make early replacements difficult—and extra care of track parts something to think about.

**CATERPILLAR**, PEORIA, ILLINOIS

## DO THIS NOW



**YOU'RE THE DOCTOR.** Check those sprockets, grousers, rollers, idlers, pins, links and bushings. Proper track adjustment minimizes wear. Sprockets may need switching from side to side, and pins and bushings need turning, to provide new wearing surfaces. Shoes serve longer if you have worn grousers built up before excessive wear occurs.

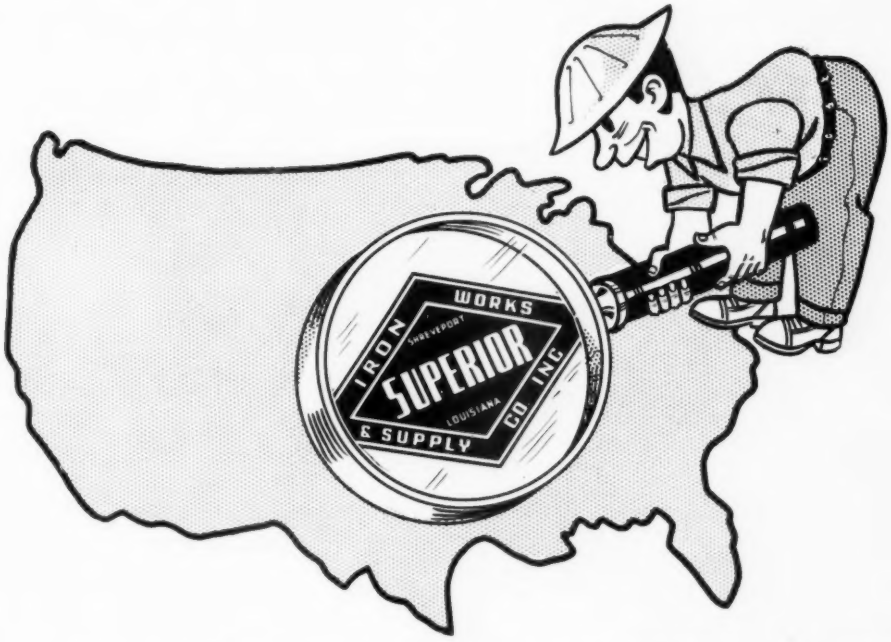
*Reread your Operator's Instruction Book.* Anticipate your future parts requirements. Take the facts to your "Caterpillar" dealer. His modern facilities and skilled servicemen are at your disposal. He can rebuild many parts to keep your machines on the job. Their added life will repay the reconditioning cost over and over.

**CATERPILLAR**

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

# the name to look for when you need supplies




When you need on-the-spot service and supplies—or technical advice—there's no substitute for a SUPERIOR store. Oil and gas men in the Mid-continent oil area turn to SUPERIOR—the name synonymous with service, quality, dependability and experience—when they want nationally-known brands of supplies and equipment they can depend on to do the job. If you need good supplies in a hurry—or the answer to an equipment problem, call your nearest Superior store.

**Shreveport, La.**
**Baton Rouge, La.**
**Lafayette, La.**
**Tinsley, Miss.**
**Stephens, Ark.**
**Camden, Ark.**
**El Dorado, Ark.**
**Carthage, Texas**
**Dallas, Texas**
**Abilene, Texas**
**Houston, Texas**
**Tulsa, Okla.**

SUPERIOR'S fabrication and machine shop in Shreveport, La., offers you general machine work; a pipe finishing plant equipped to upset, thread and couple oil country tubular goods and other type of pipes; and *complete* fabrication service. Write for SUPERIOR'S booklet, "Save Time and Money." Learn how the "Superior Method" of pre-fabrication can mean efficiency and profits on piping jobs of the oil, gas, chemical and power industries.

IRON WORKS SUPERIOR & SUPPLY CO INC LOUISIANA

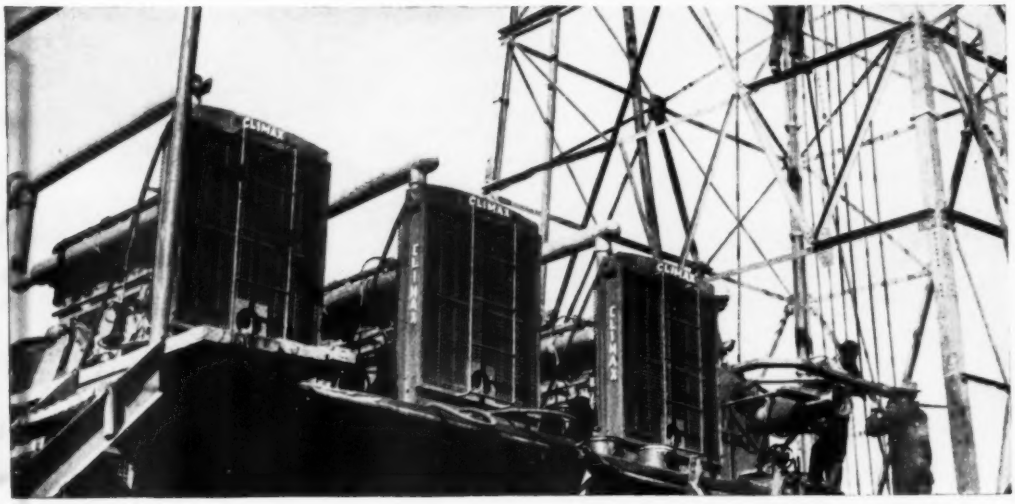
**SUPERIOR IRON WORKS & SUPPLY COMPANY, INC.**

**1202-04 MARSHALL STREET • P. O. BOX 1800 • SHREVEPORT, LA.**

NEW YORK CITY — TELEPHONE OREGON 9-3650

# DRILL DEEPER... FASTER... CHEAPER with climax

## BLUE STREAK ENGINES




STURDY, rugged, compact V-8's and V-12's have extra power for load peaks — STAYING POWER that speeds up and cuts the cost of deep drilling.

Climax Blue Streak Engines operate on natural gas, butane or gasoline, with unmatched economy and efficiency. They are instant starting, fast accelerating, smooth running, flexible, dependable prime movers, with Hi-power combustion.

**Investigate Climax Performance before you invest in any engine**

climax

*For complete information write . . .*

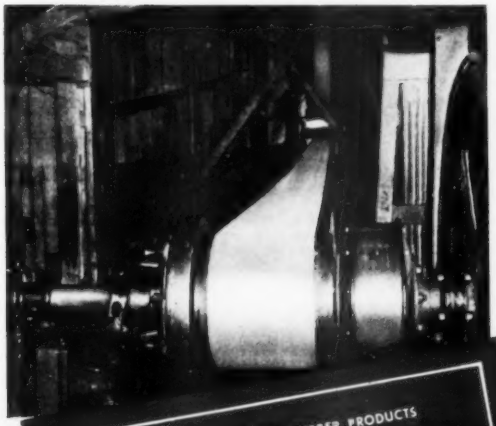
**ENGINE AND PUMP MFG. CO.**

Factory and General Office
Clinton, Iowa

Regional Offices
Chicago - Dallas - Long Beach, Cal.

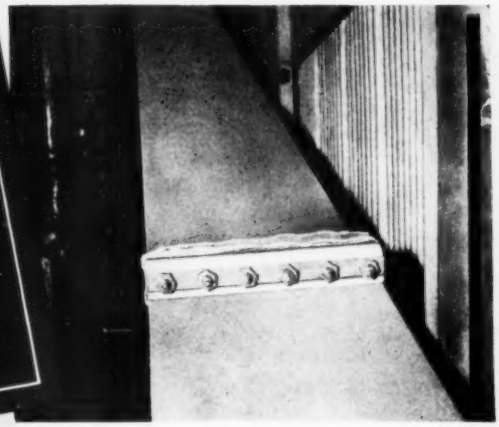
## BUY IT ENDLESS—SPLICE IT—CLAMP IT

# You can't beat Compass for Belt Service



GOODYEAR INDUSTRIAL RUBBER PRODUCTS
-Specified COMPASS CORD BELTS for
HEAVY-DUTY OIL FIELD OPERATIONS
COMPASS BELTS are bodied with multi-strand cords, laid in a single plane to carry the load. Cords on opposite sides of belt axis are twisted in opposite directions to insure true running.

Whether your COMPASS CORD belt is made endless at the factory or spliced in the field with Goodyear's patented vulcanizer-splicer, it's "tops" for service. Belt shown served 13 years so far, pumping 1,000 barrels of oil a day in spite of dust, grease and heavy overload. Ask the G.T.M.—Goodyear Technical Man—for advice on your tough drives.



Clamped, using standard compression clamps, this COMPASS CORD belt *ran for 18 years without even one take-up* driving a band-wheel pumping unit in the Southwest. No stretch, no take-up—nothing but service! The G.T.M. can help you, too, on band-wheel installations.

**FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS** built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

# GOODYEAR

**THE GREATEST NAME IN RUBBER**

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

# PRESSURE TIGHT WITHOUT LUBRICATION

- NEW TEFLON-SEAL STUFFING BOX
- CUTS METER MAINTENANCE
- ELIMINATES LEAKS
- ELIMINATES SHAFT FREEZING

STANDARD IN
1800 PSI
ORIFICE METERS

**Teflon-Seal Stuffing Boxes have been operating for more than two years without servicing in thousands of orifice meter installations! Applications such as sour gas, wet gas, caustic solutions — almost every conceivable service — have failed to impair meter operation. Maintenance problems are drastically reduced or eliminated!**

**The Teflon-Seal bearing is pressure-sealing around a precision made, centerless-ground Monel metal shaft, *without grease and with minimum friction.* All other stuffing box parts are corrosion resistant stainless steel. The Teflon-Seal Stuffing Box is suitable for ambient meter temperatures to 150°F. and working pressures to 1800 psi. Units are adaptable to older types of orifice meters now in service.**

**Here is another example of American Meter Company's policy of constant product improvement to uphold a century-old tradition of "*Sustained Accuracy at Lower Cost.*"**

***See our display, booth 101-5, Sixth National Instrument Exhibit, Sam Houston Coliseum, Houston, Texas, September 10-14.***

**PROPERTIES OF TEFLON**

Teflon (polytetrafluoroethylene) is a synthetic polymer with the following properties: low coefficient of friction — zero water absorption — high impact strength — toughness — form stability — and exceptional chemical inertness. It retains strength at temperatures from —100°F. to 550°F. and does not stick or "weld" to other materials. It resists the attack of all known solvents except molten alkali metals, with no change in weight or properties.

GENERAL SALES OFFICE: 1513 Race St., Philadelphia.
Albany • Alhambra • Amarillo • Atlanta • Baltimore
Birmingham • Boston • Chicago • Dallas • Denver • Erie
Houston • Kansas City • Los Angeles • New York • Odessa
Pittsburgh • San Francisco • Tulsa • Hamilton, Ontario

AMERICAN METER COMPANY
INCORPORATED ESTABLISHED 1836

# Alloy Steels

## HELP "KEEP HER TURNING RIGHT"

More hours of low-cost drilling . . . fewer hours of costly down-time . . . with today's high-speed, high-efficiency drill rigs and tools. Alloy Steels, plus improved design and modern drives, help lower the cost of going deeper into the world's oil fields.

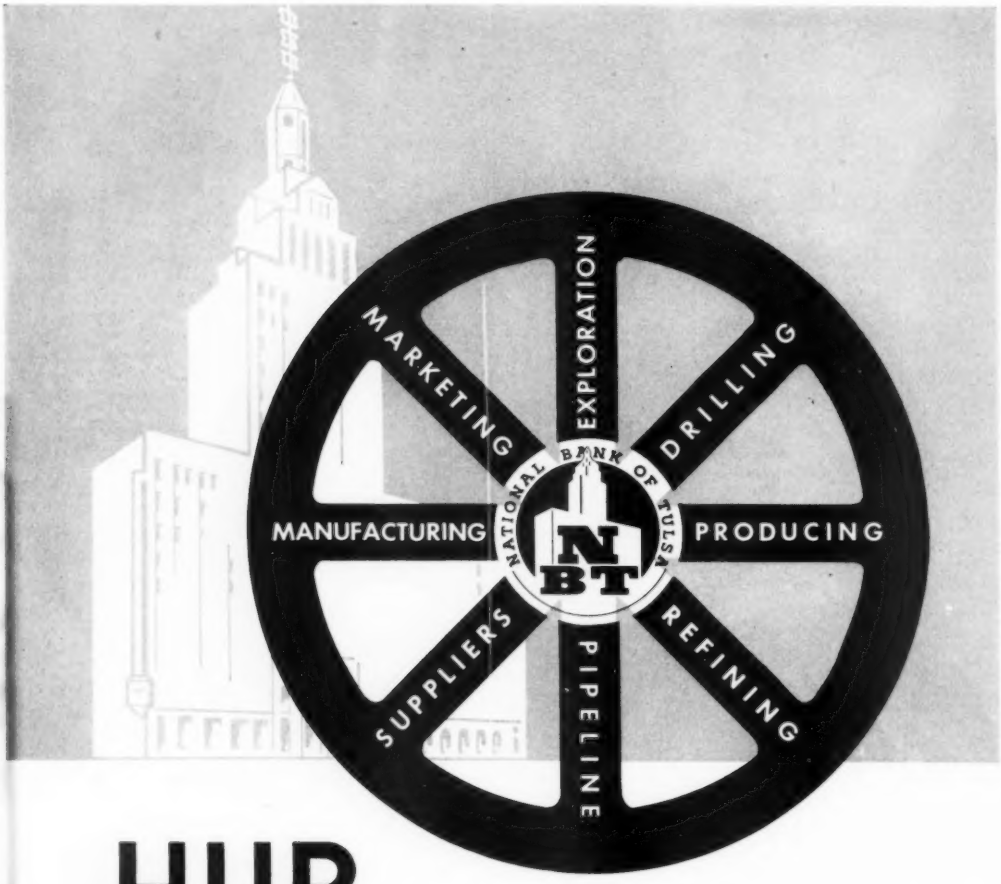
Alloy Steels by Republic give rig drives, rotaries, pump parts, and bits the extra strength and extra toughness to drill more feet of hole at lower cost. Leading rig, tool, and equipment builders depend on Republic Alloy Steels . . . products of America's leading alloy steel producer . . .

**REPUBLIC STEEL CORPORATION** • **Alloy Steel Division** • **Massillon, Ohio**
GENERAL OFFICES • CLEVELAND 1, OHIO

Republic ALLOY STEELS

REPUBLIC STEEL

**Other Republic Products include Casing—Tubing—Line Pipe—Upson Studs, Bolts, Nuts and Rivets—Electrunite Boiler Tubes**




# A HUB *IN OIL FINANCING*

Because of its long experience, resources and strategic location in the heart of the Mid-Continent oil country, NBT is a veritable hub in oil financing circles. Whatever your oil industry activity may be, look to "The Oil Bank of America" for sound, dependable service. Our staff is ready to discuss your finance problems . . . make your appointment now.

*The Oil Bank of America*

**NATIONAL BANK OF TULSA**

OFFERING COMPLETE BANKING AND TRUST SERVICES

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

# Now... NUMBER OF TANKS AND DISTANCE Unlimited

## ACCURATE *Remote* LIQUID LEVEL GAUGING

Fig. No. 850R Electronic Gauger Transmitter installed with "VAREC" Fig. No. 253 Automatic Tank Gauge.

"VAREC" Field Telephone Link Transmitter.

Fig. No. 801 "VAREC" Electronic Gauge Receiver.

## ...WITH THE NEW "VAREC" FIELD TELEPHONE LINK TRANSMITTER

Now, with "Varec's" unique new Field Telephone Link Transmitter, (when used in conjunction with its Electronic Gauger Receiver and Electronic Gauger Transmitter) distance factors are literally unlimited, as are the number of tanks possible to gauge from a single remote point.

At the turn of a dial switch, accurate, **REMOTE** liquid level gauging in oil refineries, chemical plants, pipe line pump stations and storage terminals is an important reality.

Utilization of existing telephone, Microwave or power lines minimize installation and wiring costs, in addition to material savings realized in time, labor and accurate gauging with a "Varec" Electronic Gauger installation.

Now it is possible for only one gauger or operator to obtain accurate (within 1/8") continuous gauge readings from any one or a series of tanks simultaneously. The operator needs no special electronic knowledge to maintain or service the "Varec" unit as all parts are of standard plug-in design.

A complete extra service kit is included to assure continuous, dependable operation. WESTON Meter equipped. Low voltage, low current transmission only 0.001 volts D.C. at explosion-proof tank transmitter. Designed to operate from 110-115 volt, 50-60 cycle A.C. or 220 A.C. power at receiver.

There's a "Varec" Electronic **REMOTE** Liquid Level Gauging unit to meet your requirements. Where close control of blending operations is desired, automatic high and low valve, pump and alarm control is available. Write for our recommendations on your gauging problems today.

***FOR ALL TYPES OF TANKS — FOR SINGLE OR MULTIPLE INSTALLATIONS • 4 TYPES OF "VAREC" EXPLOSION-PROOF TRANSMITTERS TO MEET WORKING PRESSURES UP TO 300 PSIG • ELECTRONIC OR MECHANICAL HI-LO LEVEL ALARM SYSTEMS.***

PROVED and APPROVED "Varec"

**THE VAPOR RECOVERY SYSTEMS COMPANY**

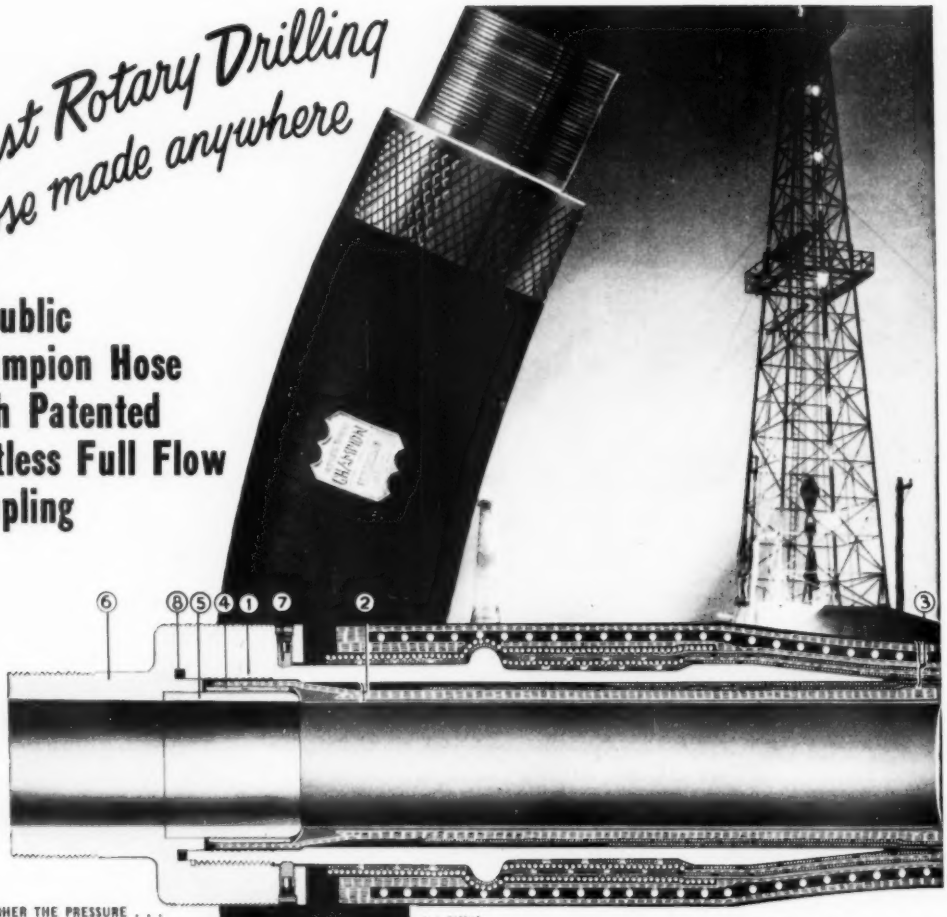
**COMPTON, CALIFORNIA, U. S. A.**

***Cable Address: VAREC COMPTON USA (All Codes)***

**New York - Boston - Pittsburgh - Chicago - Detroit - St. Louis - Houston Tulsa - Casper, Wyo. - Provo, Utah - Los Angeles - San Francisco - Seattle**

*Best Rotary Drilling Hose made anywhere*

# Republic Champion Hose with Patented Boltless Full Flow Coupling




**THE HIGHER THE PRESSURE . . . THE TIGHTER THE SEAL**

In Champion Rotary Drilling Hose the nipple (1) is built in between the metal reinforcements of the hose carcass (2) and (3). The inner reinforced rubber structure (2) is anchored within the nipple and locked into leak-proof engagement by a brass expansion ring (4). This ring receives plenty of protection from the abrasive action of flowing grit by a special steel guard ring (5). As pressure pushes the reinforcing rubber structure (3) against the nipple assembly, a leak-proof union is established, and, ***as the pressure continues to increase, the tighter the seal becomes!*** Note that the cover cap (6) screws into position over the nipple assembly. It fits flush with the external diameter of the hose, leaving no projections to catch on the rigging or interfere with connections. The cap is held in position by submerged set screws and anchor cap seals (7). A rubber gasket (8) seals the joint between cap (6) and end of nipple (1).

U. S. PATENT No. 2,234,152

● Republic's Champion Rotary Drilling Hose is a strong, flexible hose that's built to withstand severe shock and higher pulsating pressures.

Built-in steel muscles resist pressure, protect the hose against distortion. Oil-resistant Reprene throughout makes the hose practically immune to abrasion or deterioration from oil contact.

Champion Rotary Drilling Hose is available in standard lengths up to 60 feet. Type C Hose designed for 5000 psi test pressure, Type B for 4000 psi and Type A for 3000 psi. See your Republic Distributor or write direct for further information.

INDUSTRIAL RUBBER PRODUCTS BY

**REPUBLIC RUBBER DIVISION**

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

**MID-CONTINENT DISTRIBUTORS**

Jones & Laughlin Supply Co.
Tulsa, Okla.

The Bovaird Supply Co.
Tulsa, Okla.

**EXPORT DISTRIBUTORS**

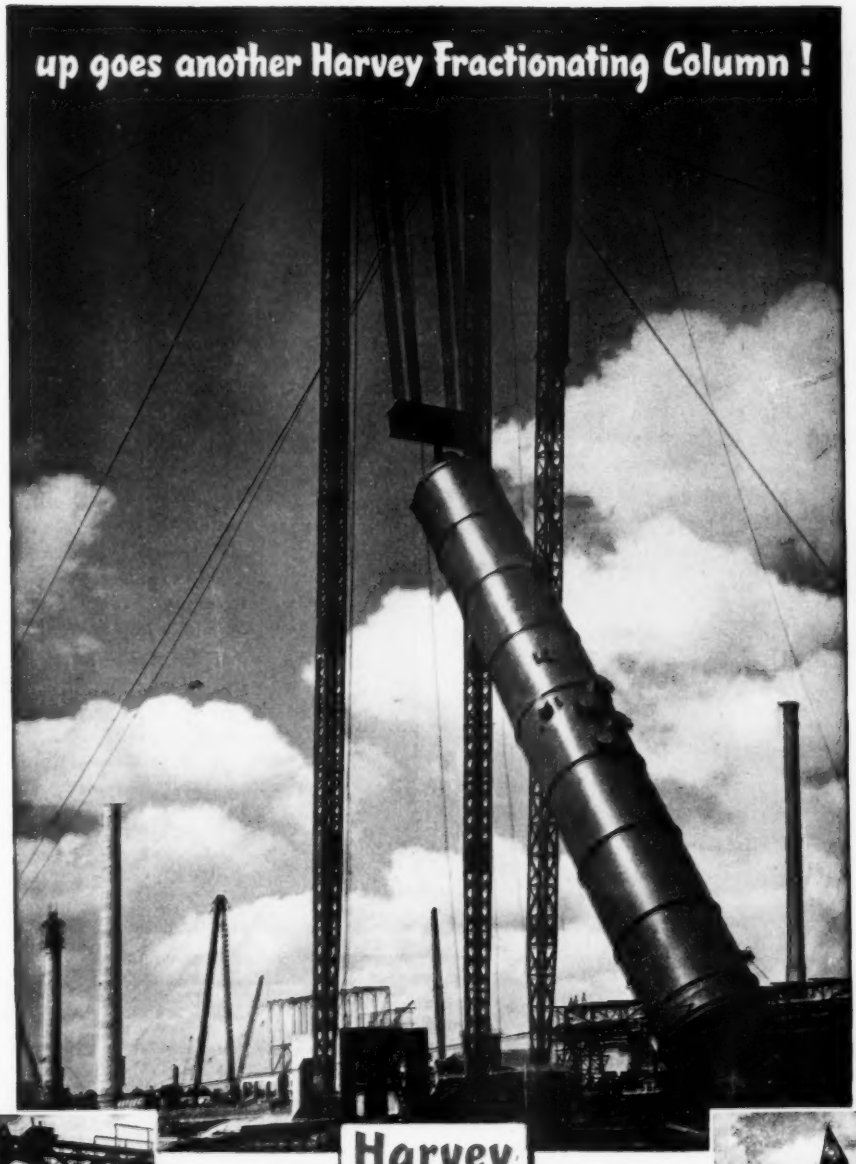
Jones & Laughlin Supply Co.
230 Park Ave.,
New York 17, N. Y.

**WEST COAST DISTRIBUTORS**

W. C. Hendrie & Co., Inc.
405 Towne Ave.
Los Angeles, Calif.

Pacific Coast Rubber Co.
51 Main St.
San Francisco, Calif.

# up goes another Harvey Fractionating Column !



**Harvey**

This Column, fabricated by Harveys, was lowered into the Thames near their London works, towed across the North Sea, lifted from the water at Pernis, near Rotterdam, and soon became an active part of the Royal Dutch Shell Group's New Oil Refinery. Harveys undertake all forms of heavy constructional work for the Oil and many other Industries.

Send for Catalogue OG 750

G. A. Harvey & Co. (London) Ltd. Woolwich Road, London, S.E.7

# Something New IN "NATIONAL BLUE"

## IDEAL TYPE "E" HOOK BLOCKS

National Supply announces the new line of IDEAL Hook Blocks, for working capacities of 90, 140 and 200 tons, designed to utilize the maximum strength of 1″—1⅛″—1¼″ lines respectively with a reasonable factor of safety.

The Type "E" Hook Blocks are a unitized assembly, composed of a traveling block and combination hook and connector. These new blocks effect the maximum saving of vertical derrick space —between block cap and swivel bail.

Operators can use IDEAL Hook Blocks as a hook to support the swivel bail directly, or the drilling string may be supported by the elevator with links connected to the hook line support.

Write for more information, or check at your nearby National Supply Store.

**Features of the new Hook Block line include:**

- ★ Sheaves mounted independently on tapered roller bearings
- ★ Interchangeable sheave and bearing assemblies
- ★ Each sheave bearing lubricated individually
- ★ All parts locked securely for safety
- ★ Automatic-latching hook tongue cannot open under load

## THE NATIONAL SUPPLY COMPANY

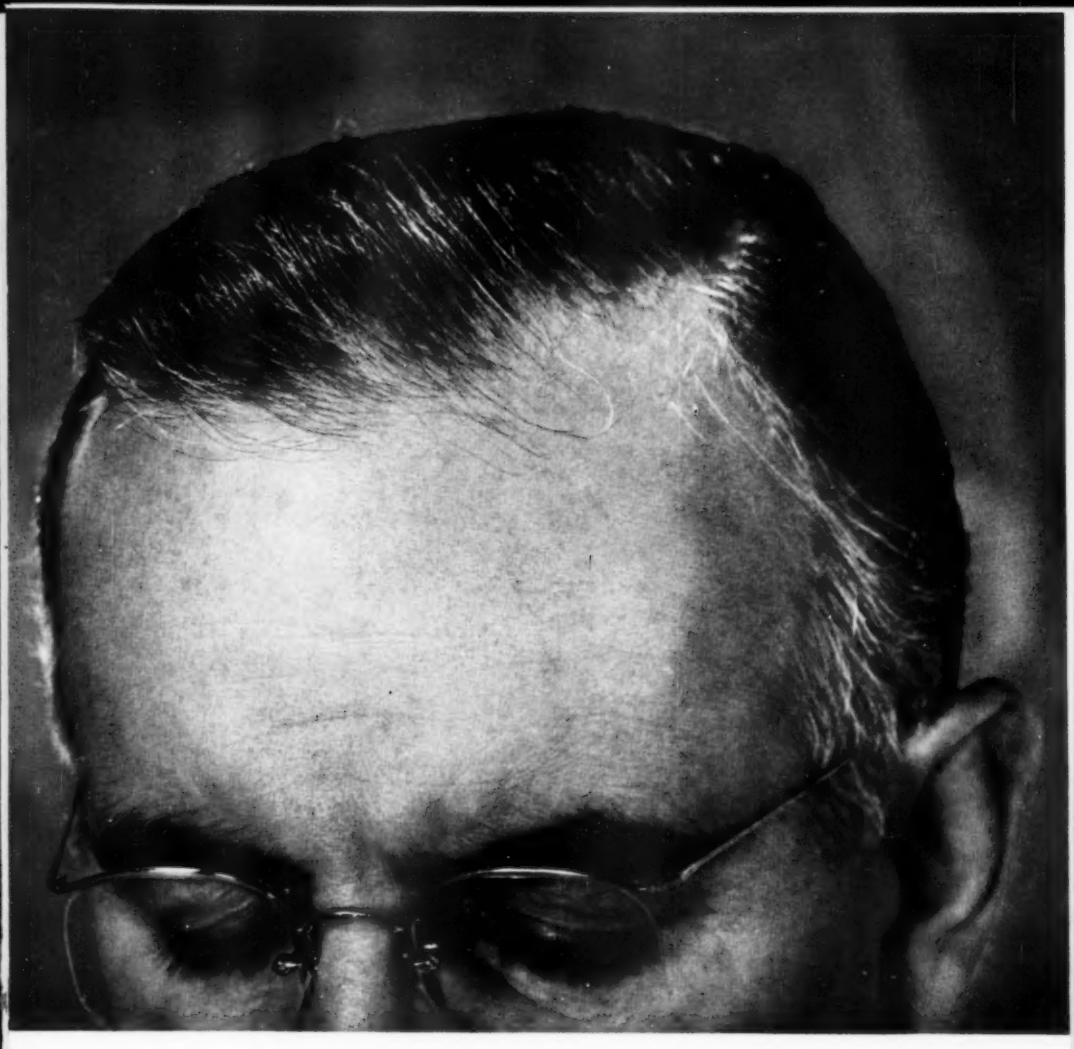
**General Sales Offices: Toledo, Ohio**

NATIONAL BLUE PRODUCTS

*DIVISION OFFICES:* CASPER; FORT WORTH; HOUSTON; PITTSBURGH; TULSA; TORRANCE.

*CANADA:* THE NATIONAL SUPPLY COMPANY, LIMITED, 702 BARRON BUILDING, 610 EIGHTH AVE., WEST, CALGARY, ALBERTA.

*EXPORT:* NATIONAL SUPPLY EXPORT CORPORATION, 600 FIFTH AVENUE, NEW YORK 20, N.Y., U.S.A.; RIVER PLATE HOUSE, 12 S. PLACE, LONDON E.C. 2



## Research apparatus that cannot be duplicated

AMONG the many unusual pieces of apparatus which have been developed during the past quarter of a century at the Ethyl Laboratories, there is one that it would be extremely difficult—if not impossible—to duplicate.

That is our collection of human minds, each with the unique knowledge and experience needed to make progress in a highly specialized field. Only such

(*continued on next page*)

ETHYL
ETHYL CORPORATION

## Research apparatus that cannot be duplicated

(*continued from preceding page*)

minds can fully grasp the complex, interrelated problems of fuel hydrocarbons, antiknock ingredients, lubricating oils, engines, and engine operating conditions. And only such minds can be of substantial help to the petroleum industry.

Ethyl has been building its research and service teams for over twenty-eight years. Many of our original people are still with us. They form the nucleus of an organization which now includes over four hundred fuel, antiknock and engine specialists, and one hundred and fifty representatives in the field. These people are not only individually capable, but they have worked and developed together as a team so that their collective value to Ethyl customers is far more than the net total of their individual capabilities.

Most important to you, this Ethyl team works for you every working hour, every working day of their lives.

**ETHYL CORPORATION**

**NEW YORK 17, NEW YORK**

*Experience**

*is the most important ingredient in "Ethyl" antiknock fluid*

FARM SERVICE

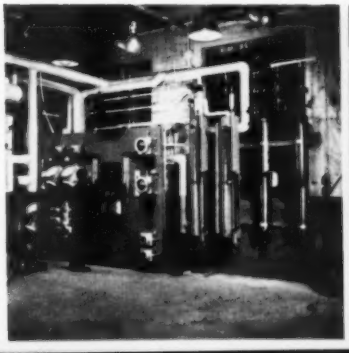
FUEL RESEARCH

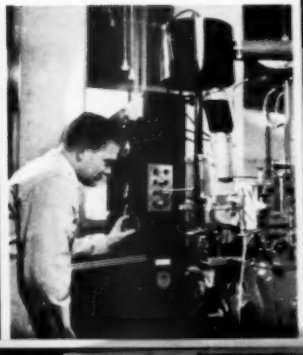
ROAD RATINGS (indoors)

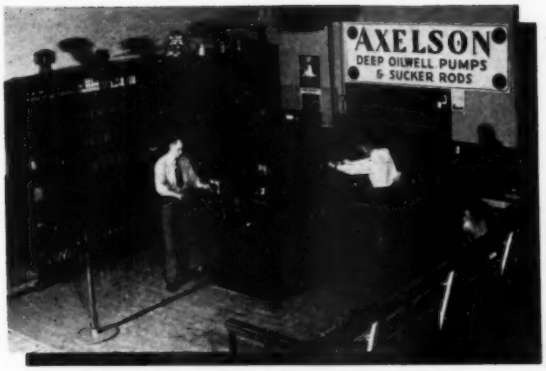
PREMIUM GASOLINE PROMOTION

SAFETY SERVICE

GASOLINE TESTING








This Axelson pump repair shop at Edmonton, Alberta, Canada, is typical of Jones & Laughlin Supply store service. Conducting a demonstration of repair techniques are, left, H. C. King, Senior Field Salesman, and J. J. Crawford, Store Manager.

# Never Junk an Axelson Pump!

Want to save money on bottom hole pumps? Want to produce your wells more satisfactorily? Axelson plus your near-by Jones & Laughlin Supply store are the answer.

Axelson uses its 56 years experience in perfecting designs, selecting better materials, and manufacturing to higher standards.

Jones & Laughlin Supply makes these Axelson products readily available through its 105 sales points—PLUS pump repair shops in many stores.

In these well equipped and expertly manned shops the useful life of Axelson pumps can be extended almost indefinitely. NEVER JUNK AN AXELSON PUMP—bring it to your nearest Jones & Laughlin Supply store for low-cost reconditioning.

## Jones & Laughlin Supply Company

Subsidiary of
Jones & Laughlin
Steel Corporation

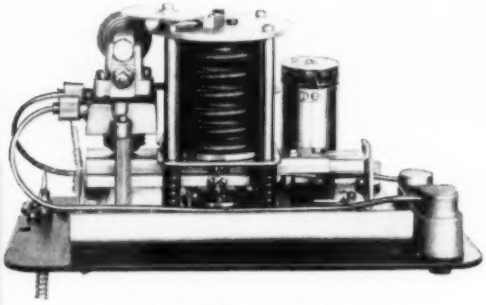
J&L STEEL

TULSA, OKLAHOMA

**EXPORT: 405 LEXINGTON AVE., NEW YORK, N.Y. U.S.A.**

# DYNAMIC ACCURACY means more today than ever before!

**Accurate Measurement** of changing temperatures and pressures is the vital first step in instrumentation, whether indicating, recording or controlling. Today, TRANSAIRE* Transmitters set new standards for sensitive and accurate measurement.



## TEMPERATURE:

**Taylor TRANSAIRE Temperature Transmitter with Speed-Act*** lets you measure and transmit smallest temperature changes up to 1000 feet with great accuracy! The *only* temperature transmitter that gives you:

**1. DYNAMIC ACCURACY**—which means the accuracy of an instrument in measuring changing or dynamic conditions. TRANSAIRE Dynamic Accuracy is unparalleled. Solves the problem of process engineers who realize that an instrument accurate to a fraction of a degree in measuring static conditions can be in error by many degrees when temperature is changing.

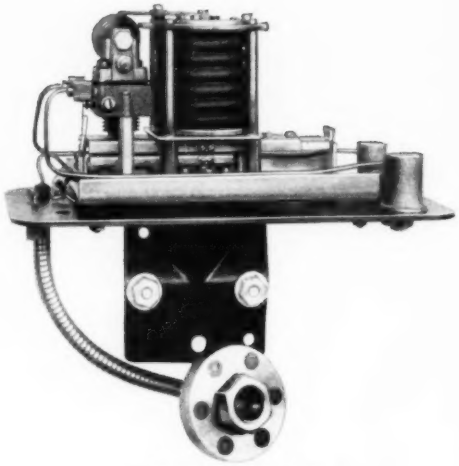
**2. DYNAMIC COMPENSATION**—which means ability to compensate for inherent lags both in measuring system and rate of heat transfer of process medium. TRANSAIRE does this by introducing derivative action (Speed-Act) into *measuring* circuit. The result is Dynamic Accuracy, with a speed of response seldom thought possible, permitting much closer automatic temperature control.

**TRANSAIRE is the first step** in Taylor's TRANSET* Control System. Step No. 2 is either Taylor's three-response TRI-ACT* Controller, or the lower cost, BI-ACT* Controller which gives stability with one adjustment. Step No. 3 is the Taylor TRANSET Recorder or Indicator. All three combine into the famous Taylor TRANSET Control System. **Write for Bulletin 98097.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

*Instruments for indicating, recording and controlling temperature, pressure, humidity, flow, liquid level, load, speed and density.*

*Trade-Mark

Taylor's Centennial ACCURACY FIRST SINCE 1851



## PRESSURE:

**Taylor TRANSAIRE Pressure Transmitter with narrow range spans** lets you measure and transmit minute pressure changes up to 1000 feet. Works on simple force-balance principle. Accurate to $\frac{1}{2}\%$ of the selected short range span (*conventional devices are only accurate up to $\frac{1}{2}\%$ of upper range limit*). Sensitive to pressure changes of $\frac{1}{2}''$ water. Here's accuracy and sensitivity never before thought possible in measuring process pressures—plus the convenience of suppressed ranges at high pressure levels.

**THREE IMPORTANT ADVANTAGES:**

**1.** Range spans of 20 and 40 psi available throughout range limits of 35 to 415 psia.

**2.** Volumetric type pressure system is extremely accurate, practically clog-proof, has corrosion-resistant 316 stainless steel diaphragm.

**3.** Temperature and barometric compensation for higher accuracy of measurement and control.

*Taylor Instruments*
MEAN
**ACCURACY FIRST**
IN HOME AND INDUSTRY

# ROTOCURE Eliminates this "Achilles Heel"*

** Overcured Sections which occur every 30' to 40' are a primary cause of failure in belts made by the flat press method. You won't find these "Achilles Heels" of double vulcanization in BWH Mfg. Happy Transmission & Conveyor Belting.*

## WITH BWH MFG. Happy Transmission Belting

*DIAGRAMATIC SKETCH OF*
***ROTOCURE PROCESS***

Curing a small segment of rubber belting *twice* is unavoidable when belts are made under the conventional flat press method. With this "stop and go" technique, a cured segment is advanced slightly less than a press length. As vulcanization is resumed, an overcured segment results due to overlapping. This twice-cured segment is a critical section or "Achilles Heel" of about 2 to 4 inches in length and the width of the belt. It is responsible for structural weaknesses and excessive surface wear which cause early belt failure and high maintenance costs.

To solve this problem, BWH technologists pioneered the ROTOCURE process of *continuous* vulcanization whereby every *inch* of belting receives the same, *uniform* curing treatment. Here are 4 important reasons why ROTOCURE has paid off for users throughout industry, in installation after installation—by longer service life before replacement.

1. **Because there is no double vulcanization, uniform abrasion-resistant covers are always assured**
2. **A continuous vulcanization eliminates the overlaps which can reduce flex life up to 40%.**
3. **Mechanical distortion (inherent with flat press curing at the press ends) is eliminated.**
4. **Constant uniform stretch results at all times.**

As with transmission belting — so with conveyor belting, the BWH ROTOCURE process provides all these advantages plus a higher coefficient of friction because dusting agents are not required in the manufacture with ROTOCURE.

Call in Happy or write us direct for the full story of ROTOCURE and what it can do for you in keeping transmission and conveyor belts working efficiently longer — and holding belting costs down to earth.

*Another Quality Product of*

**BOSTON WOVEN HOSE & RUBBER COMPANY**

**Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

SERVING FOR... 31 HAPPY YEARS

**BWH Industrial Hose**
**Happy Coolers**
**Rubber Belting**
**Leather Belting**
**Bull Dog V-Belts**
**Sure-Grip Sheaves**
**P & H Engine Starters**
**Safety Switches**
**Happy Pumping Units**
**Power Transmission Equipment**

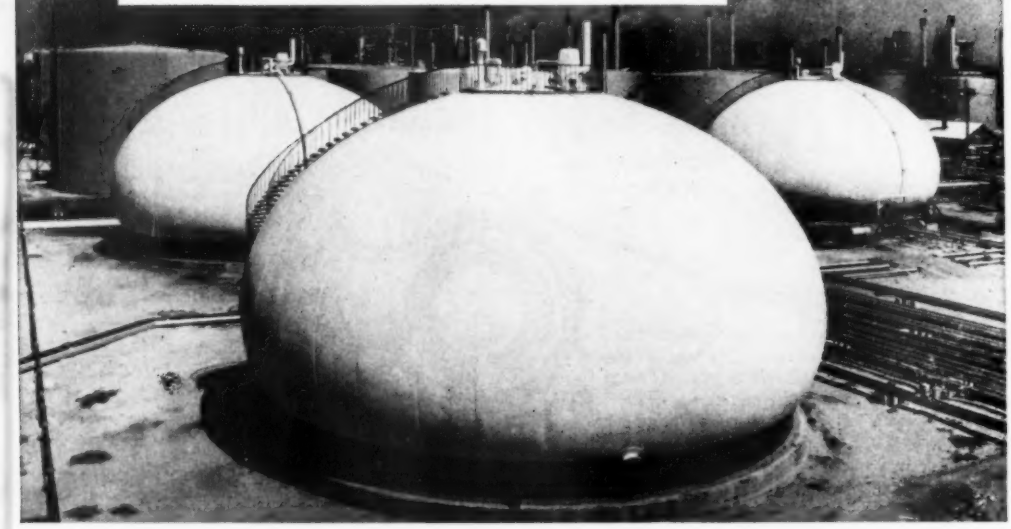
The HAPPY COMPANY
Formerly HAPPY BELTING COMPANY
TULSA, OKLAHOMA

**BRANCH STORES:**
Seminole, Oklahoma
Smackover, Arkansas
Odessa, Texas
Salem, Illinois
Ellinwood, Kansas

**DISTRICT REPRESENTATIVES:**
Kilgore, Texas
Wichita Falls, Texas
Wichita, Kansas

## For Efficient and Economical Protection — Use . . .

# PITTSBURGH TANKHIDE!



PAINT protection that really lasts—that's what you get when you use Pittsburgh TANKHIDE for your major tank and structural steel painting requirements.

● **TANKHIDE** primers and finishing coats have been used most satisfactorily for many years in all sections of the country to protect millions of tons of iron and steel structures, equipment and machinery.

● **The combination** of intensely white Titanium pigments in weather-resistant synthetic vehicles has made Synthetic White Tankhide a durable, long-lasting metal protective paint.

● **Its high heat** and light reflection characteristics prevent the excessive heat absorption that brings about evaporation waste. Not only is this low evaporation loss maintained but its brilliant white appearance lasts because of TANKHIDE'S unique self-cleaning action.

● **With proper spray** manipulation, Synthetic White TANKHIDE will hide thoroughly with one coat. Satisfactory hiding can also be obtained by careful brush application where spraying is not possible.

● **Pittsburgh offers** a complete line of protective coatings for every need in the petroleum industry—production and refinery finishes for towers, pipe lines, buildings and equipment; METALEAF Aluminum Paints; service and bulk station paints; pump enamels and drum finishes.

● **Call on us** for expert advisory service. Our wide experience in supplying finishes to the petroleum industry can be helpful and even save you time and money!

• • •

**PITTSBURGH PLATE GLASS COMPANY**

Industrial Paint Division, Pittsburgh, Pa.

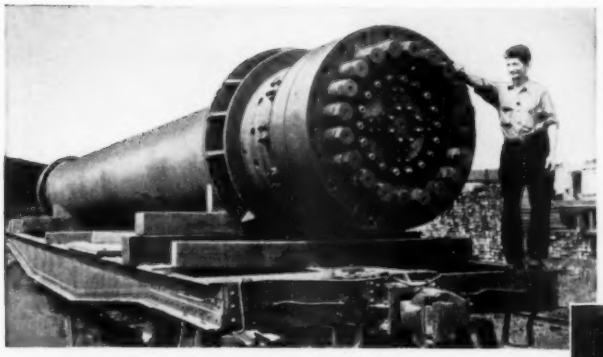
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PPG

PITTSBURGH *Industrial* FINISHES

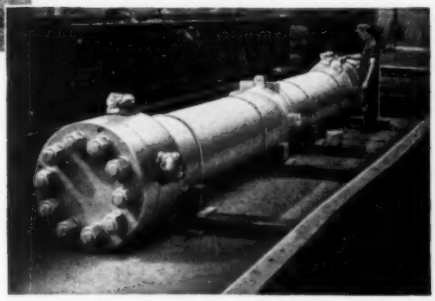
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY



One of several MULTI-LAYER Converters designed for 5000 psi working pressure, with corrosion-resistant type 405 alloy inner shell. Wall thickness 8¼ inches, weight 182,000 lb. This type of construction is ideal for high pressure synthesis of coal and shale.

MULTI-LAYER Heat Exchanger designed for 5100 psi working pressure. Wall thickness 4¾ inches, weight 45,800 pounds.



# A.O.Smith
# MULTI-LAYER
## Heat Exchangers & Pressure Vessels

### The practical, *economical* solution to your high pressure process and storage requirements

MULTI-LAYER vessels are built-up from concentric layers of relatively thin steel plate, progressively *wrapped, tightened* and *welded* around an inner, pressure-tight cylinder.

**Greater range** of process possibilities for the planning and design engineer are provided in this unique, patented construction.

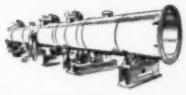
**Walls** can be made stronger merely by increasing strength of steel wrapping plates or by adding more layers.

**For corrosive service,** only the inner cylinder need be fabricated of alloy or non-ferrous materials.

**No size or weight limitations** as MULTI-LAYER vessels or heat exchangers can be made in any diameter for which satisfactory end closures are available.

**The full** calculated strength of the steel is more fully utilized in MULTI-LAYER vessels. Wrapping tension and weld shrinkage develop compression in the inner layers. This results in more equalized loading of all portions of the vessel wall under working pressure.

**Safety** is greatly improved by MULTI-LAYER construction. Only the inner cylinder need be pressure tight! Outer layers are provided with vent holes which protect the vessel against damage from over-pressure. In the remote event of run-away overload sufficient to cause failure, there is little danger of fragmentation of the vessel wall, due to the nature of MULTI-LAYER construction.



**Consult** A. O. Smith for assistance on your heat-exchanger or pressure-vessel problems. In any event, write for Bulletins V-52 and V-53 for more complete information on MULTI-LAYER Pressure Vessels and their construction... or use handy coupon.

A.O. Smith 77th ANNIVERSARY 1874 - 1951

**A.O.Smith**

**VESSELS • HEAT EXCHANGERS**

Boston 16 • Chicago 4 • Cleveland 15 • Dallas 2 • Denver 2
Houston 2 • Los Angeles 22 • Midland 5, Texas • New Orleans
New York 17 • Philadelphia 3 • Pittsburgh 19 • San Francisco 4 • Seattle 1
Tulsa 3 • Washington 6, D.C. • Milwaukee 1, Wis. • International Division: Box 2023, Milwaukee 1

A. O. Smith Corporation
Dept. OG-151, Milwaukee 1, Wis.

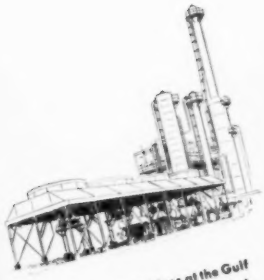
Without obligation, send me Bulletins V-52 and V-53 on your MULTI-LAYER Pressure Vessels and their construction.

Name_____

Firm_____

Street_____

City_____ State_____



Cleveland vertical drives at the Gulf Oil Corporation's gasoline plant, Eunice, New Mexico. 25 units are utilized in cooling operations at this natural gasoline plant.

# Trouble-free service for years with CLEVELANDS

HUNDREDS of Clevelands drive cooling tower fans at refineries. Reports from plant operators indicate that they are uniformly dependable. Regardless of dust and exposure to extreme heat and humidity, they operate continuously with minimum attention, at high speeds and for long periods of time.

Cleveland vertical drives are compact in construction, ruggedly built to operate anywhere under adverse conditions. They are engineered to carry the high thrust and radial loads normally encountered in cooling tower service. Simplicity of design makes for easy installation, adjustment and service in the field.

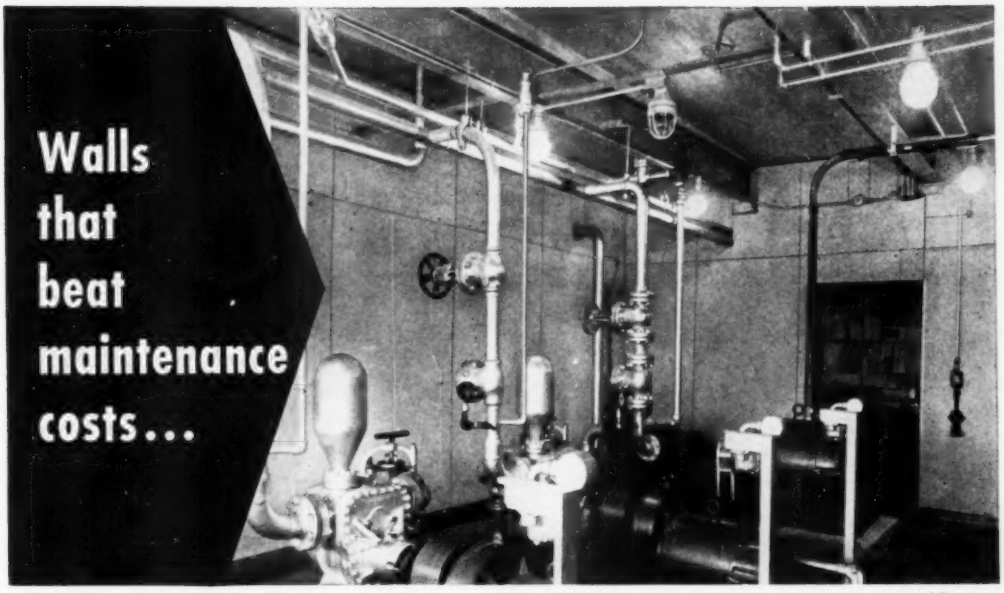
There are other Cleveland units available for any service where the many advantages of a powerful, right angle drive are desired.

Write for Bulletin 135 which gives a full description and technical data on the Type CU drive—Cleveland's special cooling tower unit. Ask also for literature on other types of worm gear drives.

The Cleveland Worm & Gear Company, 3286 East 80th Street, Cleveland 4, Ohio.

*Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.*

**CLEVELAND**
**Worm Gear**
*Speed Reducers*




Water treatment room in large utility plant. Walls are "Century" APAC, ⅝" thickness.

# they're "Century" APAC!

In the water treatment room above you see how to build walls that won't need maintenance: Use "Century" APAC—Keasbey & Mattison's versatile asbestos-cement structural sheet. APAC can fill nearly all your surface covering needs . . . interior walls and ceilings . . . exterior walls . . . on new structures and modernizations.

**CONSIDER THE ADVANTAGES OF APAC:**

**APAC won't burn!** Made of asbestos fibers and Portland cement—both inorganic—APAC will not support combustion . . . makes an excellent fire-retardant barrier!

**APAC is maintenance free!** It cannot rot, rust, or corrode—rodents and termites can't hurt it. APAC doesn't even need protective painting to preserve it!

**APAC is easy to handle—easy to apply!** Can be cut and fitted on the job—no milling or planing to bother with. Large-size sheets (standard 4′ x 8′) facilitate rapid coverage. Can be fastened with ring fettered nails or screws. Application labor costs are kept to a minimum!

You'll find "Century" APAC used today in hundreds of plants, in dozens of industries: For siding, office paneling, fire-resistant sheathing in shops and stockrooms, storage bins, linings for elevator casings, shower stalls—in fact, wherever quick, economical construction and maintenance-free service are wanted. Write us for complete information on "Century" APAC and the name of your nearest distributor.

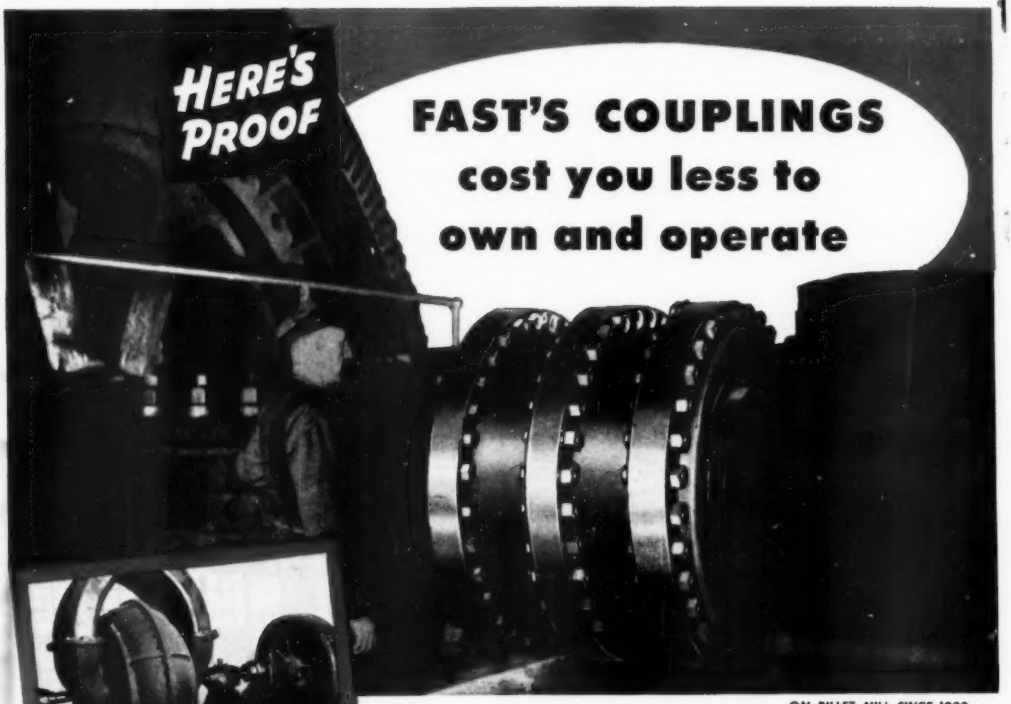
**KEASBEY & MATTISON**

**COMPANY • AMBLER • PENNSYLVANIA**

*Nature made Asbestos . . .* Keasbey & Mattison has made it serve mankind since 1873

HERE'S PROOF

# FAST'S COUPLINGS cost you less to own and operate

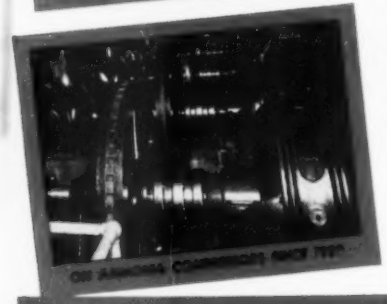


ON BILLET MILL SINCE 1923

Fast's Couplings cost you less per year because they normally outlast the equipment they connect. That means their reasonable cost can be spread out over 20 years or more . . . assuring low-cost service without excessive maintenance costs!

Fast's basic design is *foolproof!* Instead of a perishable oil seal, Fast's are the only couplings to use a *permanent* metal-to-metal closure. Oil is always maintained at a safe level . . . whether the coupling is running or standing still . . . and dirt cannot get in. Fast's Couplings are compact, yet large enough to stand up under punishing service for 20 years or more!

When you specify Fast's Couplings, you get Koppers' valuable engineering service. In many cases where a special coupling appears necessary, Koppers engineers can modify a standard Fast's and save you money! Get the facts on Fast's Couplings. Mail the coupon for your copy of Fast's *free* Catalog today!



**Mail Coupon for FREE Catalog**

KOPPERS CO., INC., Fast's Coupling Dept.,
288 Scott Street, Baltimore 3, Md.

Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

KOPPERS

FAST'S

THE ORIGINAL GEAR-TYPE

Couplings

INDUSTRY'S STANDARD FOR 31 YEARS

# "WORK-TEAM"

## of the irrigation industry

For heavy production at extra low operation cost, Layne built wells and Layne vertical turbine pumps are the most widely used work-team of the irrigation industry. Thousands of installations in well water irrigation areas have unmatched records of high efficiency and dependability. Capable of producing great quantities of water cheaply, they make well water irrigation a profitable business. Furthermore, their superior quality and rugged construction can always be depended on to provide years and years of fine service at extremely low upkeep cost.

IDAHO—One of the two 1,800 gallons per minute Layne vertical turbine pumps installed for irrigating potatoes, wheat, peas and hay crops.

NEBRASKA—An angle gear drive Layne vertical turbine pump powered with a gasoline engine. Installation is for irrigation corn and other grain crops.

The same type wells and pumps installed for irrigation are also the Nation's most widely used by cities, factories, railroads and processing plants of all kinds. All are built complete by Layne and Layne alone. No other make is so generally recognized for highest efficiency and longer lasting service. No other is so thoroughly proven by actual field performance records.

**LAYNE & BOWLER, INC. GENERAL OFFICES, MEMPHIS 8, TENN.**

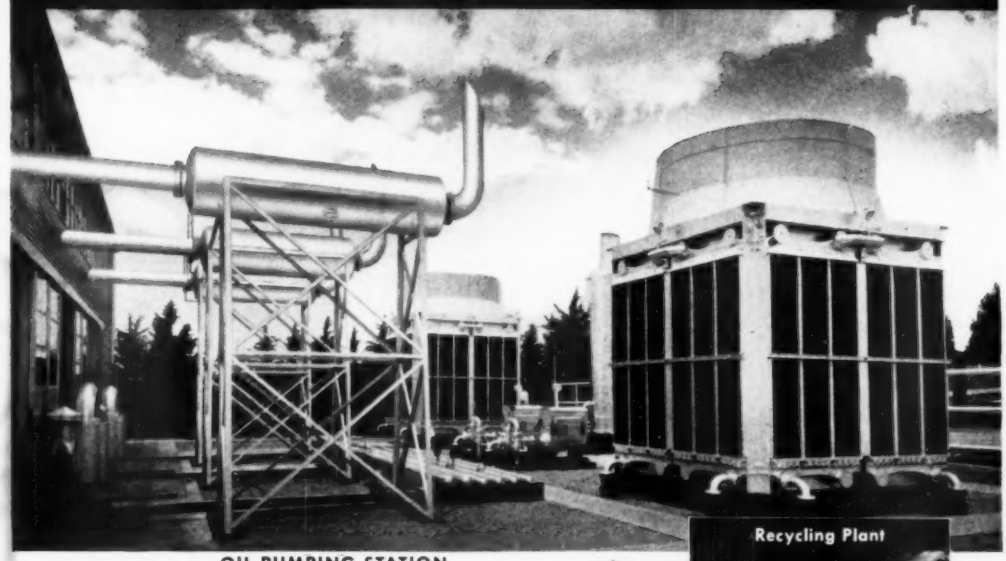
**NEW CATALOG ON WATER SYSTEMS**

Fifty-two pages of vitally interesting and helpful information on the Layne method of building well water systems; tubular and rock wells, special drilling services, shutter screens and vertical turbine pumps with a section on engineering and useful tables. A copy will be sent without obligation if requested on company letterhead.

Layne
WATER SUPPLY
**WELLS & PUMPS**

# *For Quiet Engine and Compressor Operation*

## Install Burgess-Manning Snubbers



OIL PUMPING STATION

*From the Well-Head Through the Refinery Gate, It's Burgess-Manning . . .*

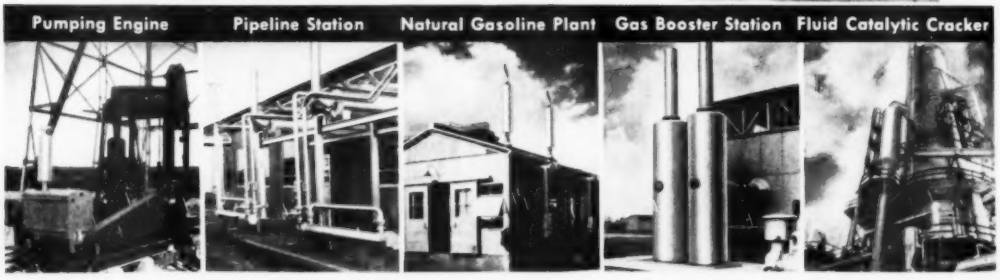
From one end of the oil field to the other . . . quieting the thunderous roar of engine exhausts and the throbbing pulsations of compressor intakes, you find Burgess-Manning Snubbers doing an outstanding job of reducing noise to the noise-level of the surrounding area. Eliminating vibration in equipment and pipe lines. Simplifying metering. Improving engine and compressor performance. Consult Burgess-Manning, today.

Recycling Plant

Compressor Station

**BURGESS-MANNING COMPANY**

749 East Park Avenue, Libertyville, Ill.
1203 Dragon Street, Dallas, Texas

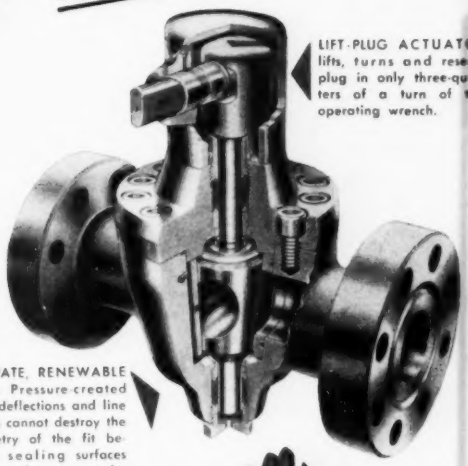


Pumping Engine | Pipeline Station | Natural Gasoline Plant | Gas Booster Station | Fluid Catalytic Cracker

# Name the job

## HERE'S THE VALVE THAT WILL GET IT DONE *Right!*

## NO GREASING NO CHEATERS



LIFT-PLUG ACTUATOR lifts, turns and reseats plug in only three-quarters of a turn of the operating wrench.

SEPARATE, RENEWABLE SEAT: Pressure-created body deflections and line strains cannot destroy the geometry of the fit between sealing surfaces because they cannot be transmitted to the separate seat.

## Cameron

### NON-LUBRICATED
### LIFT-PLUG VALVE

**A dependable pressure-tight closure under all conditions of service, ease of operation, and minimum maintenance . . . these are the principal requirements for an oilfield valve and the Cameron Non-Lubricated Lift Plug Valve provides all three. A tight seal is obtained when the plug engages a separate seat which is not attached to the valve body. Pressure forces and line strains, instead of causing the sealing surfaces to separate, actually improve the seal. Less than one full turn of the operating wrench is required to open or close the wrench-operated model and the operation requires little torque. Since the valve requires no lubricant for sealing, it needs little or no maintenance.**

**The unique mechanical features of the Cameron Non-Lubricated Lift Plug Valve are fully illustrated and described in a pamphlet which is available to all interested operators.**

## CAMERON IRON WORKS, INC.

P. O. BOX 1212 HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y.

Represented in the sterling area by: British Oil Field Equipment Co., Ltd., Duke's Court, 32 Duke St., London S.W.1, England.

**SECONDARY RECOVERY**

**ACIDIZING**

**FORMATION FRACTURING**

***all find great advantages in***

# LANE-WELLS

# BOCI

## PACKERS

For fluid injection, for pressure-acidizing, or for any other operation which concentrates tremendous pressure *below* the packer, the Lane-Wells BOCI Packer is the answer to an engineer's prayers. Just run in the packer, set it, take up on the tubing (this packer is set by *tension*), and you're all set. The greater the pressure below the packer, the tighter it sets.

No more turnbuckling the tubing — which can play hob with the tubing and doesn't always work, anyway. No more loading the annulus above the packer — which sometimes failed, too, and always involved extra expense, extra time and maybe extra equipment.

P.S. Extra Advantages. Lane-Wells BOCI Packer also acts as a tubing anchor, if the tubing is kept in tension, and insures a straight string with minimum wear on rods, plus maximum pump efficiency. Or, when required, the BOCI can be used upside down in a regular packer application.

*Tomorrow's Tools-Today!*

LANE WELLS

AP-406

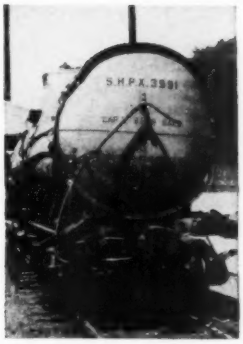
*Los Angeles • Houston • Oklahoma City • Lane-Wells Canadian Co. in Canada • Petro-Tech Service Co. in Venezuela*
*General Offices, Export Office and Plant • 5610 So. Soto St. • Los Angeles 58, California*

## Why Sunray standardized on A.C.F. All-Welded Tank Cars...after 22 years of shipping experience!

Ever since the late 'twenties, Sunray Oil Corporation had leased A.C.F. Tank Cars.

As a lease-shipper, Sunray's shipping records were basically very simple. They boiled down to: *did the lading get there safely?*

The safe-delivery record set by A.C.F. Tank Cars was good. So good that Sunray ordered *only* A.C.F. *cars,* when they decided to operate their own tank cars!



This A.C.F.-built Tank Car took severe punishment in a recent wreck. Not a drop of lading was lost thanks to A.C.F. superior construction.

### • *The Order: 200 All-Welded Cars*

When Sunray ordered, they never lost sight of the extra safety of A.C.F. Double Welding. Every inch of weld seam is stronger and more ductile than the parent metal. And X-ray testing proves every inch of tank-seam weld for all 200 Sunray cars!

There's a lesson for every shipper in Sunray's experience. Find out about the cost and safety advantages of A.C.F. All-Welded Tank Cars. Write American Car and Foundry Company, 30 Church Street, New York, N. Y. Sales Offices in: Chicago • St. Louis • Washington Cleveland • Philadelphia • San Francisco.

A.C.F. **ALL-WELDED TANK CARS** *for Safe Delivery—*

# TRET·O·LITE

has long been recognized as the best buy in crude oil demulsification. This recognition has been earned by many years of practical performance, supervised by the largest staff of trained dehydrating engineers in the world. You can prove this statement easily and to your own advantage — just call your Tretolite service engineer on your next treating or corrosion problem.

**TRETOLITE COMPANY**

SAINT LOUIS 19, MO. • LOS ANGELES 22, CALIF.

*Chemicals for the Petroleum Industry*

DEHYDRATING • DESALTING • CORROSION INHIBITION
SCALE PREVENTION • WATER RE-USING • PARAFFIN REMOVAL

**ARKANSAS**
EL DORADO, Phone 3-7347
MAGNOLIA, Phone 413

**CALIFORNIA**
LOS ANGELES, Phone ANgelus 7247
BAKERSFIELD, Phone 3-3459
COALINGA, Phone 841
ORCUTT, Phone 3-2911
SANTA PAULA, Phone 1156-M
TAFT, Phone 5-4303
VENTURA, Phone Miller 3-5203

**ILLINOIS**
CARMI, Phone 6449
MT. VERNON, Phone 227
OLNEY, Phone 1036

**KANSAS**
GREAT BEND, Phone 5321 or 3740
HAYS, Phone 217
McPHERSON, Phone 1775
PRATT, Phone 1196
RUSSELL, Phone 824
WICHITA, Phone 4-8314
YATES CENTER, Phone 650

**KENTUCKY**
COVINGTON, Phone JU-8277
HENDERSON, Phone 4354

**LOUISIANA**
HOUMA, Phone 7220
JENA, Phone 376
LAFAYETTE, Phone 1170
MONROE, Phone 10597
NEW ORLEANS, Phone VA-6598

**MICHIGAN**
MT. PLEASANT, 31-141 or 24-863

**MISSISSIPPI**
JACKSON, Phone 2-6337
McCOMB, Phone 2184

**MISSOURI**
ST. LOUIS, Phone RE-3500

**MONTANA**
BILLINGS, Phone 9-4422

**NEW MEXICO**
HOBBS, Phone 449

**OHIO**
OBERLIN, Phone 495

**OKLAHOMA**
ADA, Phone 1179
ARDMORE, Phone 1792
DUNCAN, Phone 487
OKLAHOMA CITY, Phone 9-5424 or 5-0188
SHAWNEE, Phone 3693
TULSA, Phone 2-1133
WEWOKA, Phone 488

**TEXAS**
ALICE, Phone 503
AMARILLO, Phone 8935
BEAUMONT, Phone 2-1522
BIG SPRINGS, Phone 466
CONROE, Phone 1624-J2
CORPUS CHRISTI, Phone 4-6927 or 2-4081
DALLAS, Phone RI-4530
EL CAMPO, Phone 918
HOUSTON, Phone WO 7457
KINGSVILLE, Phone 1336
LEVELLAND, Phone 865-W
LONGVIEW, Phone 803, 4864 or 2472-J
MIDLAND, Phone 3185
ODESSA, Phone 3111
PORT ARTHUR, Phone 2-9769
SAN ANTONIO, Phone CA-9871
SEMINOLE, Phone 605
TYLER, Phone 4-8338
WICHITA FALLS, Phone 2-1312 or 8242

**WYOMING**
CASPER, Phone 2006
CODY, Phone 1197-J

**CANADA**
CALGARY, Phone 23546
EDMONTON, Phone 25803

**SOUTH AMERICA**
CARACAS, VENEZUELA, Phone 31072

# in WIRE ROPE, too

## *It's all in the RIGHT KIND of Muscle*

The powerful, rugged muscles of a charging rhino enable him to propel his tremendous bulk and weight at truly remarkable speed. Nature designed them well for the purpose they have to serve.

In wire rope, too, the right kind of muscle is vitally important... because different types of jobs present different types of destructive forces. Bending fatigue! Shock stress! Abrasion! Load strain! Each demands wire rope that best combines the required resistance characteristics.

Wickwire Rope gives you the benefit of long experience and specialized know-how which assures you of exactly the right kind of rope your particular job demands.

For additional information write or phone our nearest sales office.

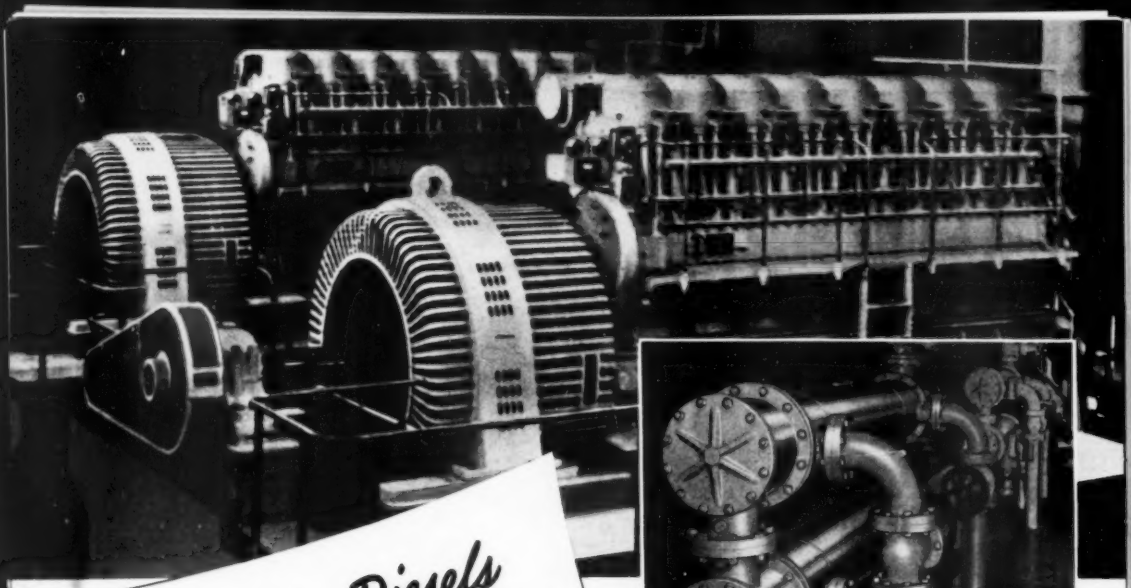
WICKWIRE ROPE
A CF&I PRODUCT

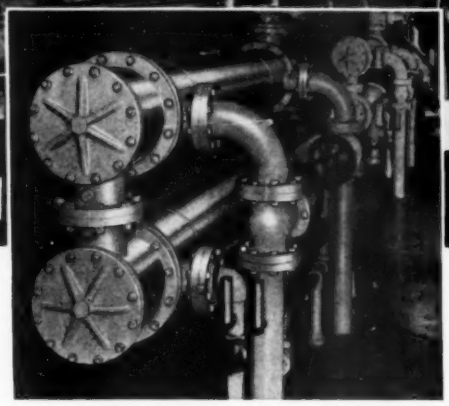
*LOOK FOR THE YELLOW TRIANGLE ON THE REEL*

EAST: WICKWIRE SPENCER STEEL DIV.—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • Philadelphia • New York
WEST: THE COLORADO FUEL & IRON CORP.—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST: THE CALIFORNIA WIRE CLOTH CORP.—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane

**WICKWIRE ROPE**

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION





# Baldwin Diesels Use Ross Exchangers

## - for simplified piping, facility in controlling engine lube oil and jacket water temperature

Mecca of vacationists from all over the world, in the center of the Adirondacks often referred to as America's Switzerland, Saranac Lake, is also distinguished in power circles for its commendable diesel electric installation.

For here, two Baldwin diesel electric generating sets consisting of two Baldwin Model 600 Diesels, 1450 bhp at 600 rpm each, direct-connected to generators with capacities of 1250 kva, 1000 kw and 2300 volts have solved, at a moderate cost, a growing power shortage during the peak-load, dry season.

Among the many distinguished features of this ideal installation is the compact, simplified, easily controlled engine cooling system which utilizes four Ross Type CP Exchangers, one for maintaining most effective operating temperature of the lubricating oil and one for the jacket water of each engine. Because the Ross Type CP is a pre-engineered exchanger, made up from fully standardized, mass-produced components and subassemblies, considerable engineering time was saved, while individualized fabrication was eliminated . . . *advantages that are attractive not only to Baldwin-Lima-Hamilton Corporation, but to most builders of diesels and compressors.*

But, the big point is not the fact that this installation is at Saranac Lake, N. Y. It could well be a diesel application of a larger or smaller rating for an oil field, pipeline, mine, locomotive, sawmill, factory or chemical plant. No matter which, no matter what the make, you'll generally find on the equipment list: "Exchangers by Ross". *Diesel builders have too much at stake — they must KNOW the exchanger can be depended upon!*

To obtain full details on the Ross CP, write for Bulletin 2.1K1 and consult with your nearby Ross representative.

ROSS

**EXCHANGERS**

**ROSS HEATER & MFG. CO., INC.**

Division of American Radiator & Standard Sanitary Corporation

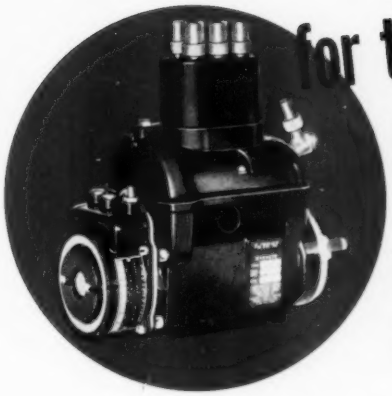
**1417 West Avenue** **Buffalo 13, N. Y.**

In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

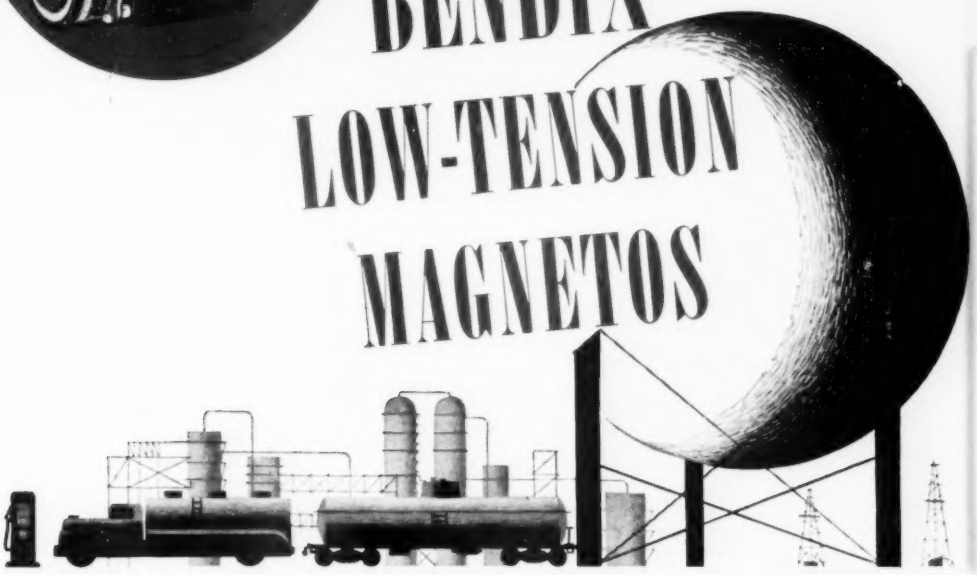
*Serving home and industry*

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

# Designed for the Petroleum Industry—



# BENDIX LOW-TENSION MAGNETOS



It's the magneto designed to eliminate fire hazard, foremost problem of the petroleum industry. The special ventilating arrangement of the Bendix Low-Tension Magneto permits air laden with explosive fumes to enter the magneto for ventilation without danger of igniting the surrounding air. Kits are also available to convert magnetos now in use to the "flame-proof" ventilation type.

In addition to this important safety feature, Bendix Low-Tension Magnetos actually reduce engine maintenance and operating costs. For example, spark plug erosion is reduced to a minimum. The distribution of low-tension voltage to the high-tension coils is through a series of breaker assemblies, thus eliminating trouble often experienced with the conventional distributor. Variable or fixed sparks can be obtained by internal adjustment.

For safety and low operating costs it will pay you to specify Bendix Low-Tension for all your magneto requirements. Complete data available on request.

- **Low Plug Erosion Rate**
- **Breaker Type Distributor**
- **Ventilation without Fire Hazard**
- **Radio Shielding Available**
- **Variable or Fixed Ignition**

Bendix

Bendix AVIATION CORPORATION

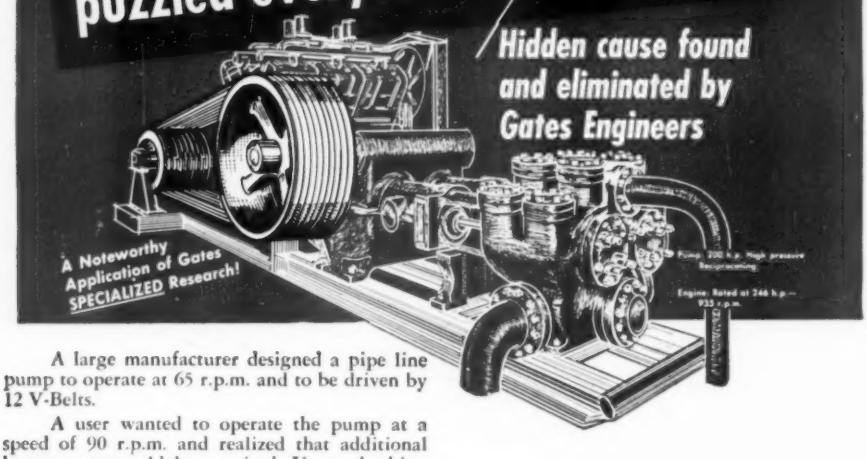
Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

FACTORY BRANCH OFFICES:

117 E. Providencia Avenue, Burbank, California • Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
Brouwer Building, 176 W. Wisconsin Avenue, Milwaukee, Wisconsin • 582 Market Street, San Francisco 4, California

# Severe vibration on pump drive puzzled everyone . . .

## Hidden cause found and eliminated by Gates Engineers


A Noteworthy Application of Gates SPECIALIZED Research!
Pump: 200 h.p. High pressure Reciprocating
Engine: Rated at 246 h.p.—935 r.p.m.

A large manufacturer designed a pipe line pump to operate at 65 r.p.m. and to be driven by 12 V-Belts.

A user wanted to operate the pump at a speed of 90 r.p.m. and realized that additional horsepower would be required. Upon checking the V-Belt drive, it was found that the additional belts required would increase the face width of the sheave and therefore the moment arm of the bearing load. Any increase in bearing load combined with the increased speed was distinctly undesirable and therefore the user sought some means of reducing the overhung weight and width of the sheave.

Learning that a *special* V-Belt had a sufficiently higher horsepower rating to gain the greater pump speed with *only 9 belts,* he had the drive re-designed to use these belts.

When installed on the job, the belts vibrated severely. At a speed somewhat below the desired range, the belts would fly completely off the sheaves. Operation was so rough that it was almost impossible to run the pump at all.

Gates Engineers were called in for consultation. Their analysis indicated that the particular belts used formed a *too-compliant* link between the pump and the engine. This allowed tortional vibration to build up to excess. Therefore, belts of *less compliance* would have to be used.

Accordingly, Gates Engineers wrote specifications for belts having the necessary h.p. rating but with the exact *degree of compliance* that would avert the vibration. These special V-Belts were built by Gates—installed—and the drive operates smoothly under all loads and at all speeds within the range.

The excessive vibration is gone. The clutch operates smoothly at any speed. And 13 additional pumps have since been equipped with identical belts—all operating most satisfactorily.

Gates ability to analyze and correct obscure drive difficulties is no accident—for Gates operates the largest V-Belt Testing Laboratories in the world. And Laboratory findings are carefully checked by tests made under actual field conditions. Finally, the *results* of these exhaustive tests are immediately reduced to *usable data* for the design of V-Belt drives to *perform whatever task may be required.*

### Phone for a Gates Field Engineer

Only under exceptional circumstances, of course, will you ever need belts of special construction. But, more often, some drive in your plant may not be operating quite as it should. Or you may have a particularly difficult drive to design. Again, you may want to be sure what size and construction of V-Belts will give the most efficient and the lowest cost service on a certain drive. In any case, you have only to phone a Gates Field Engineer, *always near you* in all industrial centers.

Just look in your phone book under "Gates Rubber." A Gates Field Engineer will come right to your plant and put at your service the full benefits of Gates V-Belt knowledge and experience *without the slightest obligation!*

ENG-518

Gates
Hose V-Belts
Molded Rubber Goods
for Industry

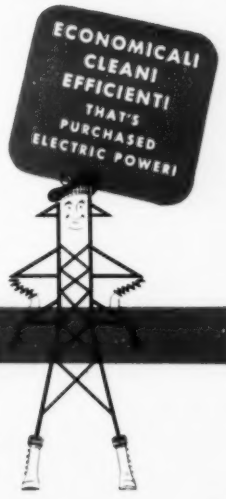
VULCO ROPE DRIVES
ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY
The World's Largest Makers of V-Belts
DENVER, U. S. A.

# IT'S POWERED BY

# Electric Power

This clean, modern pipe line terminal near Houston, Texas, is another example of PURCHASED Electric Power efficiency and economy. Hundreds of similar installations now help to keep the nation's expanding pipe line systems operating with less manpower and at lower costs during these inflationary times. While there's a chance to save thousands — perhaps millions of dollars — don't decide until you have fully investigated the more efficient, low cost advantages of PURCHASED Electric Power!




**Petroleum Electric Power Association**

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

*CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS*

*OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS*

*To help you lengthen equipment life and save critical materials . . . . . .*

# Some important facts about GALVANIC CORROSION and how you can control it

**With strict conservation of basic defense materials again the order of the day, this brief discussion of bi-metallic corrosion may save you a few unnecessary headaches**

When two dissimilar metals are coupled in a corrosive liquid – brine, for example – one metal is often attacked by corrosion at a faster rate than usual.

The second metal may remain free from attack. Or it may be corroded at a slower rate than usual.

This type of corrosion is known as "galvanic corrosion."

## What to look for

Before blaming galvanic action for corrosion in your equipment, you should first determine whether these three conditions exist:

1. **Are the metals different?**
2. **Are they surrounded by an electrolyte?**
3. **Are they in electrical contact through a metallic path?**

A "yes" answer to all three questions should send you to the "Galvanic Series" chart reproduced at the right. Here the metals are listed in the reverse order of their "nobility" or resistance to galvanic corrosion.

*Galvanic corrosion usually results in a higher rate of corrosion of the "less noble" metal, and protection of the "more noble" metal.*

## How to use the chart

Notice how the metals are grouped. Any metal in one group can safely be used with any other metal in its own group. When you start mixing metals from different groups, however, you may run into serious galvanic corrosion of the metal higher on the list. And the further apart the metals stand, the worse this corrosion may be.

Another thing to consider in using different metals, too, is the electrical contact between them. When the metals are separated or insulated in some way, galvanic corrosion is checked.

And a third factor to keep in mind is the relative areas of the two metals. If they are in contact with each other, make sure that the parts having the smaller area are more noble than those having the larger area.

## Application

With these principles as a guide, you can tell which metals are apt to produce strong galvanic corrosion. And you can tell which are relatively safe to use in contact with each other. For example, Monel fastenings could be used on a steel tank holding a liquid without fear of galvanic corrosion.

Why? Because the relative areas of the two metals are such that the area of the less noble metal, steel, is much greater than that of Monel. Since the magnitude of the galvanic action depends to a large extent on this area ratio, corrosion in the steel will not be accelerated to any appreciable extent.

## Two good suggestions

1. Write for our free booklet, *Corrosion—Processes, Factors, Testing.* It contains a thorough explanation of galvanic corrosion, with data on the characteristics of Monel, Nickel and Inconel.

2. If you have a metal problem, take it up with INCO's Corrosion Engineering Service. Available data from their files for a particular combination of metals will be furnished wherever possible. And Corrosion Engineering will be glad to help you apply general principles of galvanic corrosion control to your specific problems.

### GALVANIC SERIES OF METALS AND ALLOYS

Corroded End
(anodic, or least noble)

▼

**Magnesium**
**Magnesium alloys**

▼

**Zinc**

▼

**Aluminum 25**

▼

**Cadmium**

▼

**Aluminum 17ST**

▼

**Steel or Iron**
**Cast Iron**

▼

**Chromium-iron (active)**

▼

**Ni-Resist**

▼

**18-8 Stainless (active)**
**18-8-3 Stainless (active)**

▼

**Lead-tin solders**
**Lead**
**Tin**

▼

**Nickel (active)**
**Inconel (active)**

▼

**Brasses**
**Copper**
**Bronzes**
**Copper-nickel alloys**
**Monel**

▼

**Silver solder**

▼

**Nickel (passive)**
**Inconel (passive)**

▼

**Chromium-iron (passive)**
**18-8 Stainless (passive)**
**18-8-3 Stainless passive)**

▼

**Silver**

▼

**Graphite**
**Gold**
**Platinum**

▼

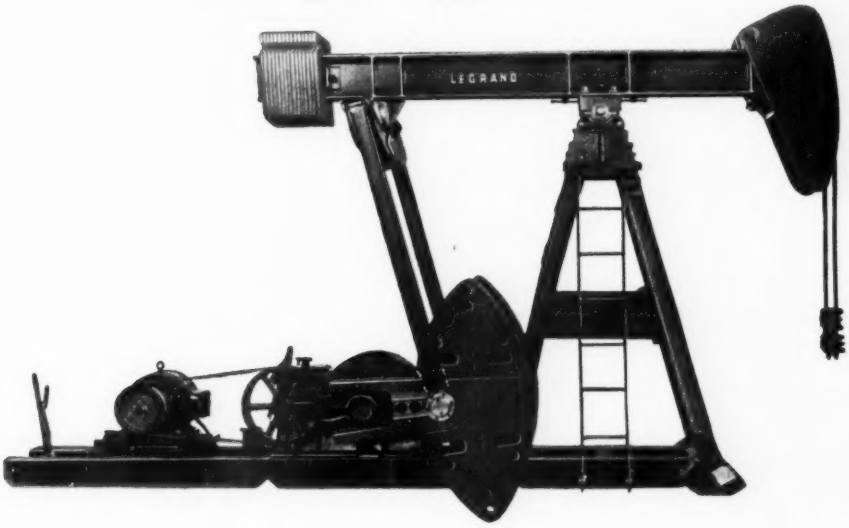
Protected End
(cathodic, or most noble)

EMBLEM OF SERVICE INCO TRADE MARK

**THE INTERNATIONAL NICKEL COMPANY, INC.**
*67 Wall Street, New York 5, N. Y.*

# LE GRAND

# Pumping Units




Illustrating the latest models of typical standard "LEGRAND" Pumping Units, built after extensive study, research, and manufacturing experience.

The Units are designed and constructed to give long, reliable and uninterrupted service. The simplified design incorporates features consistent with Field Engineers requirements under the variable working conditions found in Oil Fields all over the world.

Our Field Representatives are in the closest touch with Field Engineers and no time is lost in incorporating from the experience so gained, the latest and most modern features required to meet continually changing Field conditions.

**LE GRAND SUTCLIFF & GELL LTD**

SOUTHALL, MIDDLESEX & ROCHESTER, KENT, ENGLAND

Telephones: Southall 2211 & Chatham 4626 Telegrams: Legrand, Southall Cables: Legrand, Southall, Codes: A.B.C. 6th Edition

OILFIELD EQUIPMENT MANUFACTURERS & FOUNDERS

Find out how the pioneers in steel pipe protection combine 20 years of experience with exclusive mechanical facilities to serve you better at all six PLS plants.

PLS

PIPE LINE SERVICE CORPORATION

Pioneers in Steel Pipe Protection

General Offices and Plant • Franklin Park, Illinois

Plants at Glenwillard, Penna.; Longview, Texas; Corpus Christi, Texas; Harvey, La.; and Sparrows Point, Md.

# They Say—

### Gas-Control Protests

"Protests are pouring into Washington against the proposal of the Petroleum Administration for Defense to ban new users of natural gas, either in homes or industry.

"The Federal Power Commission has been asked by gas-industry representatives to intercede against the proposed ban on the ground that it would trespass the authority of the commission and of the State Public Service Commissions.

"Some of the protestants express concern over the longer-term implications of a bureaucratic move of nation-wide import. They contend that the problem involved can be handled by the use of existing procedures, noting that where restrictions in the use of gas have been necessary the Public Service Commissions of the different states have customarily issued restricting orders, and that the natural-gas conservation program during World War II was handled on a state and local basis."

*Editorial in the Los Angeles Times.*

### Limit the Federal Order

"Assuming restrictions are needed at all points of a shortage we still don't know why there needs to be a widespread federal order. Handling such problems is the business of the state commissions. They are much closer to the local situation than a federal agency. Certainly the Missouri and Kansas commissions need no federal help. There is a report that the Virginia commission has indicated that it wants no part of restrictions. Where this or any other state commission refuses to face up to the problem, the federal Government has to take over.

"The nub of the problem—both gas supply and steel—is the unrestrained nation-wide expansion to new territories in recent years. There is no reasonable way to supply the whole country from the limited supply of gas in the Southwest."

*Editorial in the Kansas City Times.*

### Bankroll Diplomacy

"Details of the discussions have been guarded carefully but Harriman obviously has been pouring more than sweet talk on the troubled oil of Iran. There is every reason to believe this situation has been influenced to some extent by the sweat of the American taxpayer, the healing agent that has been applied since the war to so many of the world's old sores.

"In view of the importance of Iranian oil to the western defense effort,

There is a Security Rock Bit for every Drilling Requirement

For soft or medium formations ➡ Type OE

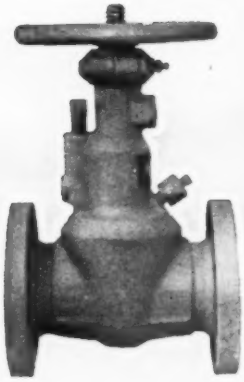
Security

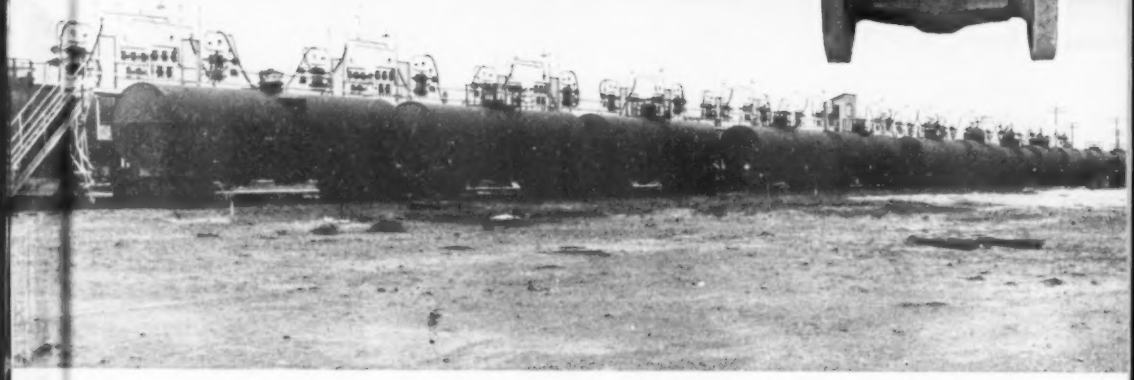
ROCK BITS • REAMERS • CORING BITS • HOLE OPENERS • CASING SCRAPERS • SECURALOY

SECURITY ENGINEERING CO., INC.
*ONE OF THE DRESSER INDUSTRIES*
*Main Office:* Whittier, California
Branches in all major producing areas
*Export Office:* Chanin Building, New York City

# A FORTUNE At Stake...

**. . . But Orbit Forged Steel L. P. Gas Valves have everything under control here.**





ORBIT VALVES ®

## Handles L.P.G. SAFELY

The Orbit Resilient Friction Free Seating principle is a Natural for holding Liquefied Petroleum Gases. Regardless of minor Body deflections, contractions or expansion brought about by fluctuating temperatures or pressures, the Orbit Seating principle is not affected. You can depend on Orbit Valve in an emergency—play safe when a fortune is at stake.

***Our new 1951 Catalog gives full detail on this modern L.P. Gas Valve. Write for a copy.***

**Branches**

HOUSTON, TEXAS — 407 Velasco
(Serving the Gulf Coast

ODESSA, TEXAS — Starr Warehouse
(Serving West Texas)

CASPER, WYOMING — The Great Western Co.
(Serving the Rocky Mountain States and Canada)

## ORBIT VALVE CO.

P. O. Box 699 TULSA, OKLAHOMA

the United States has a selfish interest in seeking a settlement on almost any terms. European industries rely almost entirely on middle eastern oil, and if that source were lost, the United States would have to dip into its own resources to make good the deficiency."

*Editorial in the Daily Oklahoman.*

### Cold Facts on Oil

"It can be stated with confidence that no Western country and no reputable, important oil company is going to help Iran.

"They are not going to supply technicians; they are not going to send tankers; they are not going to buy Iranian oil. How could they? How could Standard Oil or Royal Dutch-Shell, for instance, with their valuable holdings in Venezuela and the Middle East, reward what they must consider to be confiscation? How could a Government-owned oil industry like the Italian A. G. I. P. risk offending Britain, the United States and the oil interests of the rest of the world? How could the United States, in the present state of the "cold war," do something that would put an intolerable strain on Anglo-American relations? How could banking and financial interests anywhere do anything to encourage the seizure of private investments?

"To ask questions like these is to answer them. The cold fact is that Iran is isolating herself and committing a species of economic national suicide. If, as one hopes, there has merely been a mistaken judgment of the factors involved, then there is time to reach a solution. What Iran must understand is that every practical consideration is against her and that we live in an eminently practical world."

*Editorial in the New York Times.*

### For Flood Control

"Among other areas C.C.A. is interested in the Verdigris River section. Its refinery at Coffeyville, Kans., has been flooded 24 times since 1909. This refinery, producing at the rate of 22,000 bbl. daily, has complete lube-oil equipment involving several million dollars. Each flood causes a shutdown with resultant loss of income.

"Completion of the proposed Toronto dam is essential both for agriculture in the Verdigris River section and for the protection of this refinery, which is making a valuable contribution to national defense.

"We are thankful that C.C.A.'s properties in the Kansas City area were not damaged by water. However, in addition to sympathizing with those who did sustain serious damage, we join with them in declaring that such disasters must not happen again."

*Howard A. Cowden, president, Consumers Cooperative Association, ad-*


# For Safety and Long Service

...the *Improved* Walco

**HEAVY DUTY PIPE WRENCH**

Safety? Yes, indeed, Walworth, with more years of adjustable pipe wrench manufacturing experience than any other manufacturer, builds safety into the *Improved* Walco Heavy Duty Pipe Wrench. All parts are forged from the finest high carbon steel, heat treated to add extra strength. The jaws of the *Improved* Walco are carefully machined and hardened, affording a quick, sure grip. The handle and housing is made an integral unit by projection welding, taking advantage of projection welding's inherent strength to make the *Improved* Walco strong . . . and safe! Because the *Improved* Walco is all forged steel, it will withstand tremendous bending strains and bend—not break—when overloaded.

When you buy an *Improved* Walco Heavy Duty Adjustable Pipe Wrench safety is only one of the plus factors you get. There are many others—light weight—quick ratchet action—renewable lower jaw—calibrated pipe scale—perfect balance—and long years of satisfactory service.

Ask your Walworth Distributor to show you this new heavy duty pipe wrench. See it, heft it, and you'll want to own it.

**WALWORTH**

**valves • fittings • pipe wrenches**

**60 EAST 42nd STREET, NEW YORK 17, N. Y.**

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

# CUT CORROSION PROBLEMS DOWN TO SIZE...

## WITH TAPECOAT*

*—the Coal Tar Coating in Handy Tape Form*

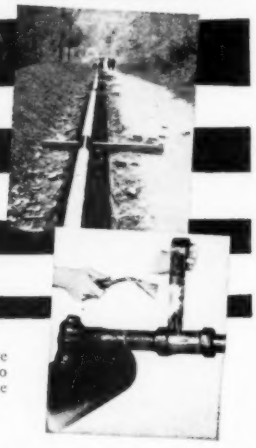
*—Sized to the job*

**24" WIDTH**

TAPECOAT — the economical coal tar coating for "cigarette-wrapping" mechanical couplings, large diameter pipe, joints, bends and drips.

**18" WIDTH**

TAPECOAT—the practical coal tar protection for "cigarette-wrapping" of large couplings, pipe bends, and joints on large diameter pipe.



**6, 4, 3, and 2" WIDTHS**

TAPECOAT — the distinctive, time-tested coal tar tape for spiral-wrapping welded field joints, service connections, pipe under streets and sidewalks, and pipe through building walls.

For more than 10 years, Tapecoat engineers have specialized in pipe joint protection. Call on them to help you meet your individual requirements. Write today for complete details.

**The TAPECOAT Company**

*Originators of the Coal Tar Tape for Pipe Joint Protection*

1539 LYONS STREET • EVANSTON, ILLINOIS

*Reg. U.S. Pat. Off.


*dressing Missouri River States committee, Kansas City, Mo.*

# CALENDAR

**August**

Wyoming Geological Association, sixth annual field conference, Sinclair, Wyo., August 1-3.

Society of Automotive Engineers, Inc., West Coast meeting, Olympic Hotel, Seattle, August 13-15.

Western Petroleum Refiners Association, regional meeting, Leonard Refineries Auditorium, Alma, Mich., August 17.

American Institute of Electrical Engineers, Pacific general meeting, Multnomah Hotel, Portland, Ore., August 20-23.

Pacific Coast Gas Association, fifty-eighth annual convention, San Francisco, August 21-23.

Eleventh Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va., August 27-29.

**September**

American Chemical Society, 120th national Diamond Jubilee meeting, Hotel Statler, New York City, September 3-7.

Michigan Petroleum Association, annual fall convention, Ramona Park Hotel, Harbor Springs, Mich., September 6-7.

International Union of Pure and Applied Chemistry, sixteenth conference, Hotel Statler, New York City, September 8-9.

New York Oil Heating Association, Inc., Hotel Statler, New York City, September 10.

Interstate Oil Compact Commission, summer meeting, Fort Worth, September 10-11.

International Congress of Pure and Applied Chemistry, twelfth conference, Hotel Statler, New York City, September 10-13.

Instrument Society of America, Coliseum, Houston, September 10-14.

American Society of Mechanical Engineers, Industrial Instrument and Regulators division, Coliseum, Houston, September 10-14.

National Petroleum Association, Hotel Traymore, Atlantic City, September 12-14.

Air Pollution and Smoke Prevention Association of America, east-central section meeting, Detroit, September 13-14.

International Union of Pure and Applied Chemistry, sixteenth conference, Hotel Statler, Washington, D. C., September 14-15.

American Institute of Chemical Engineers, national meeting, Sheraton Hotel, Rochester, N. Y., September 17-19.

Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo., September 20-21.

American Association of Oilwell Drilling Contractors, eleventh annual meeting, Texas Hotel, Fort Worth, September 24-25.

American Society of Mechanical Engineers, sixth petroleum mechanical-engineering conference, Mayo Hotel, Tulsa, September 24-26.

American Society of Mechanical Engineers, fall meeting, Radisson Hotel, Minneapolis, September 25-28.

Texas Independent Producers and Royalty Owners Association, midyear directors' meeting, Tyler, September 28.

**October**

American Institute of Mining and Metallurgical Engineers, petroleum branch, fall meeting, Oklahoma City, October 3-5.

California Natural Gasoline Association, twenty-sixth annual fall meeting, Ambassador Hotel, Los Angeles, October 4-5.

Texas Mid-Continent Oil and Gas Association, annual meeting, Hotel Beaumont, Beaumont, Tex., October 8-9.

American Oil Chemists' Society, fall meeting, Edgewater Beach Hotel, Chicago, October 8-10.

National Safety Council, thirty-ninth national safety congress and exposition, Stevens Hotel, Chicago, October 8-12.

Indiana Independent Petroleum Association, fall convention, Hotel Severin, Indianapolis, October 13-14.

Oil Progress Week, October 14-20.

American Petroleum Credit Association,

. . . to give you a superior oil field supply service!

We take a lot of pride in the kind of service we give — and that's why we work overtime to get valuable supplies to the spot where they are needed — when they are needed. Yes, our customers know that when United Supply is working for them - they will not lose valuable productive time. Our strategically located stores plus our superior service make United your best source of oil field supplies.

Courtesy
Service
Dependability

UNITED SUPPLY
AND Manufacturing COMPANY
TULSA, OKLAHOMA
Stores in Kansas, Oklahoma, Texas, Louisiana, and New Mexico

# GET POSITIVE TUBING RELEASE

UNDER ANY WELL CONDITIONS
*with GUIBERSON*

## TUBING SAFETY JOINTS!

**TYPE "F"**
A new safety joint for deep well work. Collar size O. D. Multi-layer friction ring prevents galling and seizure. Leaves box connection up when released.

**TYPE "A"**
A top quality, husky joint for deep wells. Available in two shear point strengths —2 pins for 16,000 pound shear or 3 pins for 22,000 pound shear. Leaves box connection up when released.

**TYPE "B"**
A safety joint, precision-built but low cost, for use in shallow wells. Collar size O. D. Multi-layer friction ring prevents galling and seizure. Leaves pin connection up when released.

**GUIBERSON SAFETY JOINTS**

are painted in different colors for identification and release direction.

| | RED | BLUE | GREEN |
|---|---|---|---|
| Type A | 22,000# RH | 16,000# RH | LH |
| Type B | RH | — | LH |
| Type F | RH | — | LH |

IN shallow, medium or deep wells, Guiberson tubing safety joints are your best insurance against stuck tools, bad sanding and other well hazards. Guiberson's complete line of tubing safety joints give your operator a reliable, positive point of release. Three types of Guiberson safety joints... each with right or left hand release... each with positive "O" ring seal ...in three price ranges—can keep you *safe* instead of sorry!

THE
# GUIBERSON
CORPORATION
ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.
Sold By Leading Oil Field Supply Stores Everywhere

*write today for new Guiberson catalog!*

twenty-seventh annual conference, Adolphus Hotel, Dallas, October 15-17.

American Gas Association, annual convention, Kiel Auditorium, St. Louis, October 15-17.

National Metal Congress and Exposition, American Society for Metals, American Welding Society, American Institute of Mining and Metallurgical Engineers, and Society for Non-Destructive Testing, Hotels Statler, Book-Cadillac, and Detroit-Leland, Detroit, October 15-19.

Institute of Gas Technology, annual meeting, Chicago, October 18.

National Association of Corrosion Engineers, South Central Region, annual meeting, Corpus Christi, Tex., October 18-20.

American Association of Petroleum Geologists, regional meeting, Commodore Perry Hotel, Austin, Tex., October 18-20.

Independent Petroleum Association of America, Shamrock Hotel, Houston, October 21-23.

American Institute of Electrical Engineers, fall general meeting, Hotel Cleveland, Cleveland, October 22-26.

Society of Exploration Geophysicists, eastern regional meeting, Webster Hall Hotel, Pittsburgh, October 25.

Society of Automotive Engineers, diesel engine division, Drake Hotel, Chicago, October 29-30.

Society of Automotive Engineers, fuels and lubricants division, Drake Hotel, Chicago, October 31-November 1.

**November**

Louisiana-Arkansas Division, Mid-Continent Oil and Gas Association, twenty-ninth annual meeting, Roosevelt Hotel, New Orleans, November 1-2.

American Association of Petroleum Geologists, Pacific section annual fall meeting, Ambassador Hotel, Los Angeles, November 1-2.

American Petroleum Institute, thirty-first annual meeting, Stevens Hotel and Palmer House, Chicago, November 5-8.

Gulf Coast Association of Geological Societies, first annual meeting, Roosevelt Hotel, New Orleans, November 15-17.

Rocky Mountain Oil and Gas Association annual meeting, Cosmopolitan Hotel, Denver, November 15-17.

American Society of Mechanical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, November 25-30.

Society of Exploration Geophysicists, regional meeting, Baker Hotel, Dallas, November 19-20.

Twenty-third Exposition of Chemical Industries, Grand Central Palace, New York City, November 26-December 1.

**December**

American Institute of Chemical Engineers annual meeting, Chalfonte-Haddon Hall, Atlantic City, December 2-5.

Chemical Specialties Manufacturers Association, thirty-eighth annual meeting, Mayflower Hotel, Washington, D. C., December 3-4.

New York Oil Heating Association, Inc., Hotel Statler, New York City, December 10.

**NOMADS**

**Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.**

**Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.**

**Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.**

**Los Angeles Nomads, second Wednesday of each month, Jonathan Club.**

**New York Nomads: September 11, luncheon, Downtown Athletic Club; September 16, golf party, Knoll Golf Club, Boonton, N. J.; October 1 and October 25, regular meetings, Louis Sherry's; December 8, Chrisimas dinner dance, Hotel Pierre.**

SARAN LINED steel pipe

Cut "downtime" to a minimum! Saran lined steel pipe can be cut and threaded in the field as easily and quickly as ordinary steel pipe—involving NO costly delays with special tools or handling. And, once installed, saran lined steel pipe means dependable long term operation. In addition to excellent corrosion resistance, this remarkable pipe offers you the plus values of rigidity and pressure strength.

These advantages are of prime importance to you in the reduction of shut-down time and equipment replacement. INVESTIGATE saran lined steel pipe today! Mail this coupon for full information. *Saran lined steel pipe is manufactured by The Dow Chemical Company.*

*Distributed by*

**Saran Lined Pipe Company**

2415 BURDETTE AVE. • FERNDALE, MICHIGAN
With Offices in: New York • Boston • Philadelphia Pittsburgh • Chicago • Tulsa • Portland • Indianapolis San Francisco • Houston • Denver • Seattle • Los Angeles • Cleveland • Charleston, S. C. • Toronto

**send today!**

Please send me your catalogue containing detailed information on Saran Lined Pipe, Valves and Fittings.

NAME_____

TITLE_____

COMPANY_____

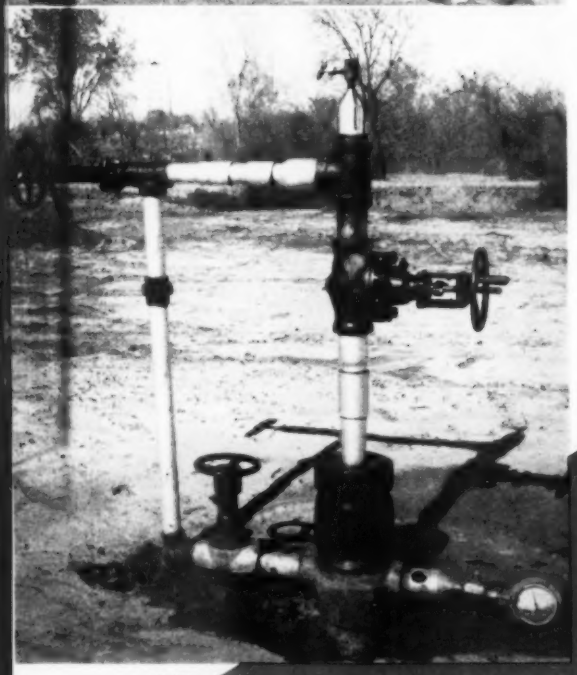
ADDRESS_____

CITY_____

STATE_____

SP-103

SARAN LINED PIPE
a
DOW
product



"Better Built"

# HINDERLITER TREES

All the features of design and performance that have made the name Hinderliter stand for better Well Head Control Units are available in Hinderliter Trees.

Regardless of your drilling and production practice, pressure, or size of well a Hinderliter *"Better Built"* Tree will provide more versatility from start to finish. It will require few changes, provide greater safety, and can be installed in less time.

In most instances various components of the head assembly can be moved from well to well, as they change from flowing to pumping production.

HINDERLITER & PORTER "Better Built" EQUIPMENT

**For your next well order a Hinderliter "Better Built" Tree**

***Through your SUPPLY STORES***

**HINDERLITER TOOL COMPANY DIVISION**

**H. K. PORTER COMPANY, INC.**

TULSA 1, OKLAHOMA DRAWER 2650

Published every Thursday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

P. C. LAUINGER
President

S. H. ROURKE
Executive Vice President

HANSON B. PIGMAN
Circulation Manager

**ADVERTISING**
MITCHELL TUCKER
Vice President

**New York Office**
500 Fifth Avenue, Phone LOngacre 4-1750
CHARLES A. WARDLEY
Eastern Manager

ROBERT N. CAIRD, JR.
Representative

**Chicago Office**
166 West Madison, Phone Central 6-2537
C. R. FARMER
Manager

E. S. KLAPPENBACH
Representative

**Pittsburgh Office**
429 Fourth Ave., Phone Atlantic 1-4835
ALFRED M. JONES
Manager

**Tulsa Office**
211 S. Cheyenne, Phone 3-6291
JOHN D. REILLY
Mid-Continent Manager
J. PARKER HOLLAND
Production Manager

**Houston Office**
Sterling Building, Phone Charter 4626
JOHN M. SPEARS
Gulf Coast Representative

**Los Angeles Office**
650 S. Grand Ave., Phone Vandike 0722
DONALD O. HANSON
Manager

**England Office**
111 Thorley Lane, Timperley, Cheshire
HARRY BECKER
European Representative
Phone Ringway 4702

Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1951 by The Petroleum Publishing Co.

Member
Audit Bureau of Circulations
Associated Business Papers

# JOURNALLY Speaking

## Chilling Experience

WE'VE been saving this picture for what we figured would be about the hottest week of the year. It's not Old Faithful, but the ice-covered derrick of a well that went wild in northern Canada last winter.

The well was being drilled by Hudson's Bay Oil & Gas Co., Ltd., 200 miles below the Arctic Circle, when it cut loose with 35,000,000 cu. ft. of gas per day and a 10-in. stream of water which shot 100 ft. high. Since the weather was 40 below, the rig was quickly transformed into a huge icicle.

This picture was taken by a couple of intrepid lads from Otis Pressure Control, Inc., who had the job of bringing the well under control. They reported that it was just a routine job after they chopped their way through a 30-ft. wall of ice but that chopping was pretty difficult because of the many layers of clothes they had to wear to keep their goose pimples from frosting over.

Turn up the furnace, Bud; we're shivering.

## Geological Onion

THE geologist, says the National Geographic Society, has come into his own; the world is his onion.

The remark was prompted by the fact that little Delaware, first state to join the Union, has just become the forty-eighth to establish a state geology staff. The society goes on to recount that some states had geology departments a century or more ago but that during the last 30 years or so the services of geologists have been in growing demand by an increasing list of industries.

Quite so, and all to the good, but that onion reference may be a bit broad. We know a couple of young geologists who came out of school thinking that the world was their onion but so far it seems to them more like garlic.

## So Wrong, So Sorry

THE boy in our circulation department who cuts the address stencils must have had his mind on South Sea island movies when he came to one of our subscribers in New Guinea. He has now been set straight by the addressee, who wrote:

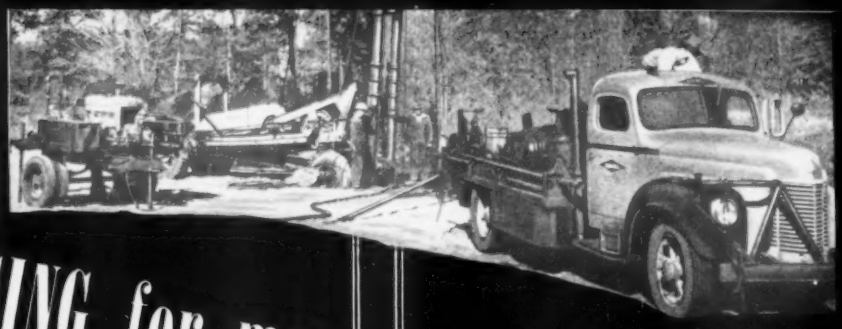
"You people have wrongly written Sarong instead of Sorong. Let me tell you that sarong means a beautifully colored piece of cloth which the native females here wrap around themselves using it as a skirt. Maybe it further helps if I tell you that the place I am working now is commonly called So Wrong and that quite incidentally it is located opposite the little island of Doom. The coincidence is full of meaning."

We take it that he doesn't care much for Sorong, with or without sarongs, but we hope that the regular arrival of our favorite oil publication will ward off his fear of Doom.

## Dramatic Iran-y

JUST before all wives and many British employes of Anglo-Iranian Oil Co. were evacuated from Masjid-i-Sulaiman field in Iran, the M.i.S. Dramatic Society staged a play which made a great hit. It was "Arsenic and Old Lace," that tragi-comic drama of demented intrigue, delusions of grandeur, and artless murder.

*—Henry D. Ralph*



# PLUGGING for more production!

## WATER SHUT OFF to Increase Oil Production by Dowell Plastic Service

Water entry into an oil well can reduce production, increase lifting costs and waste reservoir energy.

A new well made considerable water on completion. Water Location Surveys made with the Dowell Electric Pilot revealed the point of water entry to be a top section close to the casing seat. Dowell engineers used plastic to shut off this water. First, gravel was dumped on bottom and capped with plastic to protect the lower producing section. After the cap had set, additional plastic was squeezed in the section between the cap and the casing seat. Following this, the plug was drilled through and the bottom section of the well was shot. Results were excellent . . . production was 240 BOPD *with no water.*

Many workover and recompletion jobs have been successful as a result of Dowell Plastic Service. Experienced Dowell engineers spot the plastic in the right place using specially designed bailers or tubing squeeze techniques. The plastic enters the well as a fluid . . . hardening to an impervious solid after a predetermined time. Dowell Plastics penetrate the formation producing a positive bond and providing a permanent plug against encroaching fluids. Dowell Plastic Service has also been used to good effect in correcting high gas-oil ratios, in setting liners and in consolidating loose sands.

Ask your local Dowell station or office for complete information on the many uses of Dowell Plastic Service in your well workover and completion programs.

**DOWELL INCORPORATED**
TULSA 3, OKLAHOMA
Subsidiary of The Dow Chemical Company

# DOWELL

## *PLASTIC SERVICE*

Ask your nearest Dowell Station for complete information on these Dowell services and products: Acidizing Service, Electric Pilot Services, Plastic Service, Chemical Scale Removal Service for heat exchange equipment, Jelflake, Paraffin Solvents, Magnesium Anodes for Corrosion Control, and Bulk Inhibited Hydrochloric Acid.

*"First in Acidizing . . . since 1932"*

*Look to* **DOWELL**

FOR OIL INDUSTRY CHEMICAL SERVICE

the OIL AND GAS JOURNAL

August 9, 1951

VOL. 50, NO. 14

EDITOR
C. O. WILLSON

MANAGING EDITOR
Kenneth B. Barnes

NEWS EDITOR
Henry D. Ralph

REFINING EDITOR
George H. Weber
500 Fifth Avenue, New York

INTERNATIONAL EDITOR
Dahl M. Duff
500 Fifth Avenue, New York

PIPE-LINE EDITOR
Paul Reed

TECHNICAL EDITOR
W. L. Nelson

ASSOCIATE EDITORS
Lynn M. Nichols
Neil Williams
R. B. Tuttle
Philip C. Ingalls
John C. Casper

DISTRICT EDITORS
D. H. Stormont
650 S. Grand, Los Angeles
Carl F. Hoot
Mercantile Bank Bldg., Dallas
Victor Lauriston
35 Stanley, Chatham, Ont.
Bertram F. Linz
621 Albee Bldg., Washington
F. Lawrence Resen
Sterling Bldg., Houston
Ted A. Armstrong
211 S. Cheyenne, Tulsa
Joseph A. Kornfeld
211 S. Cheyenne, Tulsa
John C. Reidel
211 S. Cheyenne, Tulsa
William P. Sterne
211 S. Cheyenne, Tulsa
Robert J. Enright
211 S. Cheyenne, Tulsa
Roy F. Carlson
McClintic Bldg., Midland, Tex.

EDITORIAL ASSISTANTS
Polly DeArmond, Tulsa
Connie Farrar, Tulsa
Lucy Dee Owen, Houston

ART DIRECTOR
C. Dudley Johnston

CORRESPONDENTS AT
Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

## • NEWS FEATURES

Canada Encouraging Private Companies to Develop Oil, Gas Reserves 55
Engineers Recommending Water Flood for Redwater Field 57
Navy to Halt Search for Oil in Alaska on December 31 58
Government, Companies Set Up Pooled-Facilities Plan to Meet Iranian Loss 59
Recovery From Yenter Pool Predicted at 600 Bbl. per Acre-Foot 61
Tertiary Production in Uinta Basin Is High-Pour-Point Crude 61
Crude-Price Hike Possible Under Defense-Act Amendments 62
OPS Puts Lube Oils Under Price Controls at Wholesale Level 63
Fourth-Quarter Permits for Tubular Goods Mailed by PAD 63
PAD to Seek Deferment of Key Oil-Industry Personnel If Asked 64
Oil Industry Producing 5,000 Tons of Sulfur Annually More Than It Uses 65
British, Iranians Resume Talks Over Oil Nationalization 66
Bahrein Petroleum's New Distillation Unit Handling 72,000 Bbl. Daily 67
Communist Speechmaker Indicates Russian Oil Output Is Below Quota 68
First Venezuelan Gas Line to Begin Operation in September 71

## • ENGINEERING-OPERATING FEATURES

Application and Interpretation of Hydrocarbon Well Logging 76
Aromatics Production by Platforming Process 80
Production of Aromatics From Natural-Gas Liquids 84
Water Flooding Pays Off in South Ward, Texas Field 91
Secondary Oil Recovery 97
Combustion Gas Turbine—New Pipe-Line Prime Mover 102
Semiportable Automatic Gas Compressor Station 103
Questions on Technology 106
Corrosion and Its Control—Instruments 108
Refiner's Notebook—Cleanout Openings for Tanks 109
Engineering Fundamentals—Calculation of Flood Advance 111

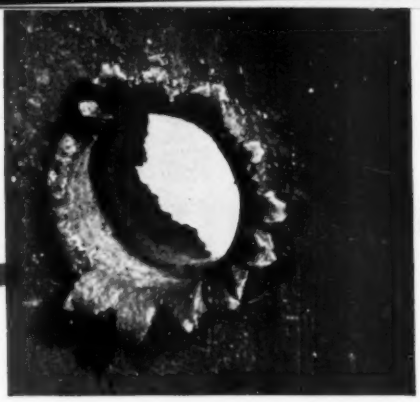
## • EXPLORATION-DEVELOPMENT

Now It's Martin County 129
Highlights of Week's Developments 129
Reports by Areas Start on Page 132

## • REGULAR DEPARTMENTS

They Say 40
Calendar of Events 40
Journally Speaking 49
Editorial 53
This Week 54
Watching Washington 64
International News 66
Personals 73
Deaths in the Industry 75
Pipe-Line Construction 112
Pipe-Line News 120
Natural-Gas News 123
Natural-Gasoline News 123
Refining News 124
Drilling Contractors 126
Equipment Men in News 145
Exploration Statistics 146
Production Statistics 147
Refining Statistics 148
Market Statistics 149
Classified Advertising 150
Advertisers' Index 155

# DANGER



## DO NOT RUN packers, testers, swabs or retainers

*...until the "working surface" of your casing is clean*

This typical burr resulting from a gun-shot hole, clearly shows why so many operators always consider it a "must" to clean the WORKING SURFACE—the vital inner wall of casing—with the new Baker ROTO-VERT Casing Scraper.

It is easy to see why tools with rubber cups, or a rubber packing element, many times fail to set properly, and often are cut, torn and hopelessly damaged while running-in the well. Ninety-nine times out of a hundred, premature setting of packers, testers and retainers, or their failure to effect a leak-proof pack-off, is due *not* to faulty construction or operation of the tool, but to burrs, cement, hardened mud, or other obstructions which . . . PREVENT PASSAGE OF THE SLIPS • CUT OR OTHERWISE DAMAGE THE PACKING ELEMENT; *or* • PRESENT SUCH A ROUGH, UNEVEN SURFACE THAT A LEAK-PROOF PACK-OFF IS IMPOSSIBLE.

The new Baker Model "C" ROTO-VERT Casing Scraper is a helix-blade-type scraper which can be either rotated or "spudded" (reciprocated vertically) for the removal of perforation burrs, imbedded bullets, cement sheath or other obstructions from the inner wall of casing. The body is machined from bar stock, with two sets of machined (not cast) blades positioned for overlapping, 360-degree scraping coverage.

The direction and angle of shear of the deeply hard-faced cutting edges is *exactly opposite* from other helix-blade-type scrapers, which means that the scraping edges of the ROTO-VERT will not "screw down" past burrs, but will actually *shear away* burrs, cement and other obstructions.

### CHOOSE THE BAKER CASING SCRAPER EXACTLY RIGHT FOR YOUR WORK

The new ROTO-VERT Scraper is at its best where hundreds of burrs, with possible imbedded bullets, or unusually long stretches of hardened cement must be removed. It operates successfully *with* or *without* rotary equipment.

***For normal scraping, where rotary equipment is present, the time-tested Baker Model "B" Casing Scraper, Product No. 620-B, continues the popular choice of many operators.***

Why not get in touch with your nearest Baker representative and secure specific recommendations for your next job? Or send for the new illustrated 28-page booklet which contains complete information on the important subject of Casing Scraping the Baker Way.

**BAKER OIL TOOLS, INC.**

**Houston • Los Angeles • New York**

**BAKER**
MODEL "C"
**ROTO-VERT**
CASING SCRAPER
PRODUCT NO. 620-C

**Scrapes the "WORKING SURFACE" of your casing CLEAN and SMOOTH**

# Failure in Alaska

The news that the United States Navy is folding up its costly venture of exploring for oil in northern Alaska will bring mixed reactions from the petroleum industry and the American public.

First there is a natural disappointment that huge reserves were not discovered in the territory, even in a region so remote as to be of little commercial importance at present. The Navy may feel that the indicated presence of two small, but undeveloped, fields, plus the geological and other information obtained, may justify the expenditure as a worth-while contribution to knowledge—a proposition which is debatable but unprovable.

The reaction of most oil men is "I told you so." There is a well-supported belief that governments cannot find oil—because of the inherent natures of government and of oil—and that no government has any business trying to wildcat. Most of the industry wrote off the Alaskan venture as a failure from the very start, even though the Navy asked and obtained the best advice and techniques of the industry.

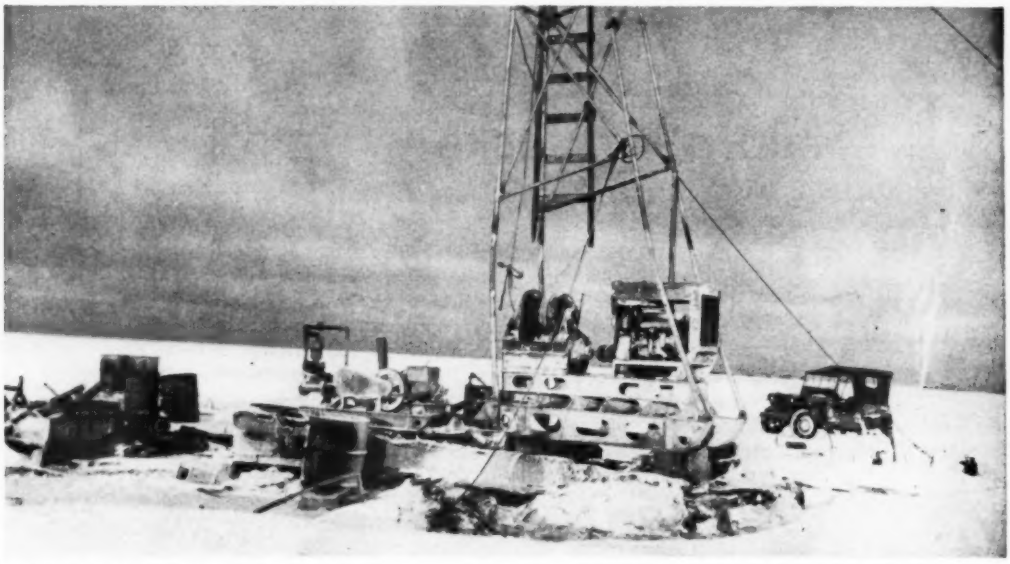
It is true that private industry also has spent hundreds of millions of dollars in unsuccessful wildcatting. But there are two big differences. First, private companies used their own money, either accumulated from earlier successes or voluntarily invested with full knowledge of the risks involved; whereas the Navy used taxpayers' money, involuntarily surrendered for essential government functions rather than for venture capital. Second, oil men wildcat in areas where a commercial payout is possible; while in northern Alaska even a tremendous discovery could not begin to return the investment for a generation in view of the world's supply and demand situation.

But the greatest conclusion from the Alaskan failure is that it again shows up the the fallacy of the "naval reserve" type of thinking which has been prevalent in Washington since the first World War. This theory is that because the Navy uses oil it should have its own oil fields. It would be just as sensible to say that the Navy should mine its own iron ore, or grow its own beans, but the bureaucratic mind puts oil in a special category.

The shibboleth of naval petroleum reserves persists in spite of the lessons in industrial mobilization learned in World War II. It should be evident to all that the strength of our armed forces is the strength of our industrial economy. The oil—as well as steel and beans—needed for war is taken out of the nation's over-all supply, and that supply is provided by private industry in war as in peace.

The best petroleum reserve the Navy could have is a vigorous petroleum industry. A free, competitive, private oil industry can provide the armed forces with many times the oil the Navy hoped to find in Alaska, and at no cost to the taxpayers. And this industry will get oil out of Alaska and many other places if there is oil to be found and when economic conditions make it practical to operate in such a remote and inhospitable area.

# THIS WEEK



*ALASKAN FAILURE.—The Navy Department this week announced plans for early abandonment of its search for oil in the Alaskan Naval Petroleum Reserve in spite of the apparent discovery of two small oil fields and a local gas supply. In addition to the rigors of extreme Arctic climate, the project was hampered by such difficulties as fire which damaged this slim-hole rig at Point Barrow.*

**PRICING**—New defense-production-act amendments requiring OPS to recognize increased costs clears the way for higher ceiling prices on crude. . . . Russell B. Brown, I.P.A.A. general counsel, urges intensive fact-gathering campaign by industry. . . . ¶New orders place wholesale sales of heavy petroleum products under formula controls. . . . Dollars-and-cents prices to be fixed for individual items later. . . .

**ACTIVITY**—Crude production averaged 6,126,200 bbl. daily for week ended August 4, down 6,725 bbl. daily. . . . Accumulated production this year is 175 million barrels more than at same point last year. . . . ¶Total completions were down 20 wells to 896 for the week. . . . Wildcat completions were off 15 wells to 102 but still 33 wells over last year. . . . ¶Rotary rigs operating in the United States on July 30 totaled 2,618 compared with 2,630 for previous week and 2,176 on same date last year.

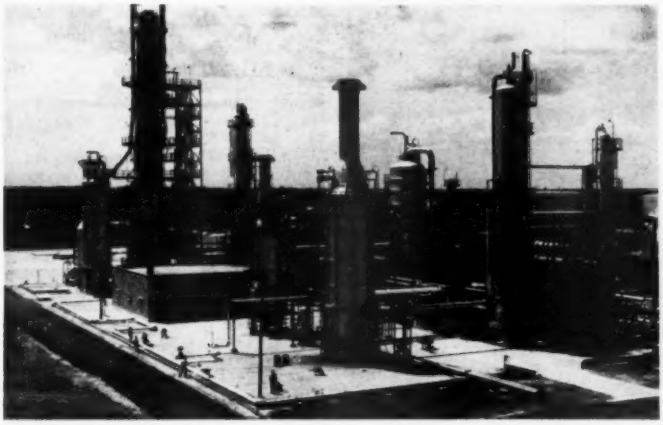
**TRENDS**—Imports of distillate and residual fuel oil show a marked downward trend and crude imports are falling off, reflecting the Iranian shutdown. . . . ¶Stocks of crude are highest in about 18 months. . . . Gasoline stocks are dropping somewhat, though still high, while stocks of other major products are increasing. . . . ¶Refinery runs are down a little, though still far above last year. . . . Gasoline production continues at high rate. . . .

**INTERNATIONAL**—British, Iranians again negotiating in what is believed to be the last British attempt to reach a settlement of the Iranian oil-nationalization issue. . . . ¶Bahrein Petroleum Co.'s big distillation plant completes initial run processing an average of more than 72,000 bbl. of crude per day. . . . ¶Communist chief in Russian province of Azerbaidzhan takes oil workers to task in effort to whip up lagging production. . . . ¶Venezuela's first major natural-gas line expected to go into partial operation next month. . . .

**PRODUCTION**—Canadian petroleum-engineering committee recommends cooperative water-injection program for Redwater field, the country's largest field and biggest reserve. . . . Three plans being discussed. . . . ¶General American Oil Co. buys 19 leases in Cochran and Hockley counties, Texas, for sum reported to be over $5,000,000. . . . ¶Executives of Southern California Petroleum Corp. and Trico Oil & Gas Co. consider merger plan. . . . ¶Yenter pool northwest of Sterling, Colo., predicted to be one of the richest fields found to date in the Denver-Julesburg basin. . . .

**GOVERNMENT**—DPA Chief Manly Fleischmann endorses agreement opening up four broad fields of cooperative action to American oil firms operating abroad to offset Iranian oil shortage. . . . ¶Navy to terminate multimillion dollar oil hunt in Alaska 1 year short of planned finish due to materials shortages. . . . ¶PAD launches drive aimed at securing deferment for key oil-industry personnel. . . .

**PIPE LINES**—Continental Pipe Line Co. plans 110-mile, 8-in. crude line from Rincon field, Starr County, Texas, to Port Isabel. . . . ¶Plains Pipe Line Co. announces main-line extension in West Texas and New Mexico. . . . ¶Chapman promises steel needed to complete stalled Platte Pipe Line Co. crude line. . . . ¶El Paso resumes work on last segment of big gas line from San Juan basin to Topock, Ariz. . . .



*IMPERIAL'S NEWEST.—This is an over-all view of Imperial Oil, Ltd.'s, 10,000-bbl. Winnipeg refinery, which went on stream June 21. It is supplied with crude from the 75-mile Winnipeg pipe line, which takes its oil from the Interprovincial pipe line at a take-off point at Gretna, Man. Work on the refinery was started April 17, 1950. Total cost exceeded $10,000,000.*

# Dominion Oil Outlook

## Government encouraging private companies to expand oil, gas production to meet country's long-term petroleum need

**C. O. Willson**

OTTAWA, Ont.—Official Canada at this dominion capital is looking forward to the time when its petroleum demands and supplies will be in balance and when its natural gas will take care of a substantial part of its fuel needs.

Encouraged by the contributions that the new supplies of crude oil, centering in the Province of Alberta, have made to postwar growth, government officials are now convinced that in further oil and gas expansion lies the solution to several problems with which Canada's economy has been long confronted.

This attitude is important to the oil industry because it should mean that the government will cooperate in every way possible to aid Canadian and United States operators in the expansion of oil and gas facilities within the dominion.

Briefly summarized, the official attitude, supported by important business interests, is this. The first big step in establishing the dominion as an important world power was the building of the transcontinental railroads. This accomplishment of another generation made possible the partial development of the country's vast resources from which every section has benefited.

**Major drawback.**—As explained by one official, the great drawback which has prevented a growth comparable to that of its neighbor to the south over the past half century has been the lack of an indigenous petroleum supply. While the United States prospered with an abundance of the most essential fuel of this century, Canada was forced, in effect, to draw heavily on its other resources to keep pace in part with the amazing growth in the use of petroleum-fueled power.

For many years previous to 1948 Canada purchased from outside sources more than 90 per cent of its petroleum requirements. Refineries supplying part of the needs were built in the eastern and western provinces, but except for the Calgary area, they obtained their crude-oil supplies largely from the United States and South American countries with smaller shipments since World War II from the Middle East.

A somewhat comparable situation existed in regard to heating fuels. Canada has large coal reserves, but those available for economic development and transportation are inadequate. The result is that the dominion is a large coal importer, principally from the United States. In 1950 out of a total supply of 46,367,915 short tons, 59 per cent was imported. The advances in United States coal prices in recent years has added greatly to the fuel costs of industry and homeowners.

Thus Canada has been putting up several hundred million dollars annually for outside petroleum and coal supplies, a severe drain on its financial resources with additional penalties to consumers owing to the high delivered costs of products.

**Current situation.**—So much for the past. Officials here are more interested in the present and the outlook for the future. They can point to several indexes which show that the increased oil supplies from Alberta are already being felt in various ways over a large part of the dominion.

Current statistical reports indicate that Canada's crude-oil production for 1951 will average about 130,000 bbl. daily. It is now 165,000 bbl. daily. In 1947 production averaged 21,200 bbl. daily. It is estimated that Canada's fields will supply 30 per cent of the total needs. Three years ago the relationship was about 10 per cent.

The saving in outside purchases is already substantial and business generally has benefited. Retail prices in the western provinces, which are no longer based on the cost of United States imports, have been lowered and Alberta crude oil is now competing with Middle West and Mid-Continent crude oils delivered in western Ontario.

In Alberta and in the eastern half of Canada there have been important increases in refinery capacity with other construction under way or authorized. Present product needs are about 350,000 bbl. daily. A petrochemical industry, greatly needed in Canada for domestic and export activities, has been started. Next year product pipe lines will serve the principal consuming area of Canada extending from Montreal to Sarnia. As of January 1 this year Canada had 38 refineries with 424,000 bbl. daily rated capacity.

Analysis here and in Toronto indicates that within the next 2 or 3 years crude-oil supply can be increased to around 250,000 bbl. daily and more if additional major fields are discovered. Present proven reserves total an estimated 1.3 billion barrels. This reserve would support a 250,000 bbl. daily production and still maintain the United States relationship between production and reserves. This analysis assumes that production would be greater during the summer months and less during the season when Great Lakes transportation is closed.

It so happens that there have been no major field discoveries in Alberta since Leduc in 1947 and Redwater and Woodbend in 1948. Golden Spike, a discovery in 1949, may be extended

so that it will have a major rating, which means a reserve in excess of 100 million barrels. There have been a number of small discoveries over the past 3 years.

**Future prospects.**—Those in government familiar with Canada's geology and related information are confident the western provinces will have many discoveries comparable to the largest already found and planning is based on that assumption. Currently there is wide interest in Canada's part of the Williston basin, in which discoveries have been made in Montana and North Dakota. Exploration operations, including wildcat drilling, are estimated to total $200,000,000 yearly.

In regard to immediate expansion, it is assumed that the capacity of the Interprovincial line from the Leduc area to Superior with water deliveries to the east will be expanded. A line west to the Vancouver area of British Columbia and northwestern United States is believed to be practical. The possibilities of such a line are now being investigated by an American and Canadian group which includes Imperial Oil, Ltd., Socony-Vacuum Oil Co., Inc., Gulf Oil Corp., and the Bechtel interests. It is understood that Shell Oil Co. of Canada has an optional arrangement to participate in the project.

The unsolved problem is how to assure other economic outlets for present and future crude-oil production of the western provinces. It is agreed that the Toronto area is probably the eastern limit for the movement of Alberta crude oil or the products made from it. At that point it comes in competition with supplies from Montreal refineries which operate with foreign crude oils brought in by water or by the pipe line which connects to Portland, Me. The small refining capacity in the maritime provinces is also dependent on foreign crude oils.

One answer is a trading arrangement involving not only Canada and the United States but also other countries in which any surplus over and above Canada's needs west of Toronto would find markets in United States. Such a program conflicts with existing trade agreements and tariffs in United States and a change by congressional action would mean a major revision in policies.

**Natural gas.**—There are government officials and business interests who feel that the expansion of natural-gas outlets in Canada is equally as important as the development of indigenous oil supplies, and they point out that the two problems parallel in many respects. In this connection, while new oil discoveries have not been outstanding over the past 3 years there has been a steady expansion in natural-gas reserves.

It is difficult to accurately gage the extent of these reserves, principally in Alberta, because there are no outlets for the new discoveries and potentialities cannot be determined except through additional drilling. Estimates by government departments and private interests range up to 12 trillion cubic feet for proven and probabe reserves. Currently there is special interest in the new discoveries in the Peace River area.

***ALBERTA GASSER.**—Aerial photograph of British American Oil Co.'s 1 Bluesky, now a capped gas well awaiting a market. The well is located in the Peace River area.*

The latest government reports show that the sales of natural gas for the first 4 months of this year totaled 29,482,895,000 cu. ft. with sales of manufactured gas totaling 10,200,000,000 cu. ft. It is agreed that the present reserves in Alberta would support a market several times the present sales of natural gas. All plans for expanded sales are confronted with the laws of Alberta which restrict the exportation of natural gas. An exception was the recent approval of a temporary exportation of gas for defense operations in Montana.

It is felt here that the large expansion in natural-gas reserves will bring a change in Alberta policy, and programs are being projected for the long-distance movement of gas on that assumption. The restrictions placed on the movement of natural gas are now tending to slow up the search for new oil. With no assured outlet for the gas there is a tendency on the part of the operators to pass up the search for oil in those areas where proven gas reserves have been established.

Here, again, it is apparent that for the immediate future at least new markets for Canadian gas will have to come largely from United States sources. To that end there are projects ready for final approval involving the movement of gas to western British Columbia, the Northwest of the United States, and intermediate points.

**Long-range view.**—But Canada is also looking forward to the time when gas from the western provinces can be brought east to serve Canada's principal markets which are located in the provinces of Ontario and Quebec. It is here that the unsatisfactory coal situation exists and where future growth in industry and general business is partially dependent on a solution to this problem of long standing.

One organized project calls for the laying of a 30-in. line from Alberta connecting to industrial and population centers of Toronto, Ottawa, and Montreal. The existing market would quickly absorb the maximum deliveries of 500 million cubic feet daily with a potential market which could be expanded to 2 billion cubic feet daily.

This, of course, would involve expenditures much greater than any of the plans for the western movement of gas, and Canadians realize this. In the meanwhile they are receptive to the plans to solve part of the fuel problem of eastern half of Canada by bringing in natural gas via existing trunk line systems connecting to United States supplies.

## Lube Plant Completed

TORONTO, Ont. — The $2,500,000 plant for the manufacture of lubricating oils and greases of Canadian Oil Companies, Ltd., has been completed at Montreal and will start operating by August 15.

This plant is one of the most complete of the North American continent and has facilities for blending and compounding of a complete line of industrial oils, motor oils, and greases. The design includes the installation of modern equipment for all types of packaging. The plant was built by The Fluor Corp., Ltd., of Los Angeles.

Canadian Oil Companies, Ltd., is now at work on the foundation for its new 20,000-bbl. refinery at Froomfield, Ont. The plant is located on a 450-acres site 5 miles south of Sarnia on the St. Claire River. It will have an initial capacity of 20,000 bbl. daily and will cost approximately $20,000,000. Stone & Webster Co. is acting as engineers in the building of the plant and will install the crude unit and some of the other facilities. M. W. Kellogg Co. will install the catalytic cracking unit. A Platforming unit of Universal Oil Products Co., the first to be built in Canada, will be part of the processing equipment.

The crude supply will be received under contract from Alberta via the Interprovincial Pipe Line Co. with water transportation from Superior, Wis. It is expected the plant will be on stream during 1953.

# Redwater Flood Talked

## World's second largest such program would boost recovery from Canada's biggest reserve; three plans being discussed

**Kenneth B. Barnes**

EDMONTON, Alta.—If recommendations of the Redwater field petroleum - engineering committee are followed, a cooperative-type water-injection program will be installed in Canada's largest oil field.

This will entail a program that in size, number of wells, and oil reserves will be second only to the successful water-injection program in East Texas field that dates back to 1938.

Redwater field, 30 miles northeast of Edmonton, produces from the Devonian D-3 coral limestone reef at a depth of 3,150 ft. The field, discovered in October 1948, has 37,000 productive acres, maximum oil zone thickness of 200 ft., a wide range of porosity which averages 6.2 per cent.

There are 869 producing wells pumping, and current production is 100,000 bbl. oil per day. The estimated ultimate production of 600 million barrels puts Redwater as Canada's No. 1 oil reserve, and one of the big fields of the entire Western Hemisphere.

**The problem.**—Engineers for the Redwater operating companies accumulated much core information as the field was drilled and since then have carefully studied production data coupled with reservoir pressure measurements and reservoir oil analyses.

Here's the situation: Analyses of the engineering data definitely prove that Redwater has an active bottom water drive. Work by Imperial Oil, Ltd., assisted by the research laboratories of Carter Oil Co., showed that this naturally occurring water drive, or water influx into the reservoir from the surrounding D-3 aquifer, amounts to 30,000 bbl. per day (method: Carter's electronic oil-field analyzer).

Independent work by engineers of British American Oil Producing Co., using the numerical methods of Hurst and Van Everdingen, also showed a natural water influx of the order of 30,000 bbl. per day.

But the pool is now producing oil at a rate of 100,000 bbl. per day, and therefore the reservoir pressure so far has declined 150 psi. from its original pressure of 1,050 psi. (cumulative oil production to date is 27 million barrels).

Of course Redwater operators could gradually cut the producing rate back to 30,000 bbl. per day, where reservoir pressure would be maintained by the natural water influx, and full water-drive efficiency would be obtained. This would be a very low producing rate—10,950,000 bbl. annually, or a depletion rate of only 2 per cent or less of the ultimate reserves per year. Thus, the Redwater engineers have very definitely gone on record as advocating extraneous water injection in amounts sufficient to produce the field at some level around 100,000 bbl. per day.

There also is another important consideration favoring the water-injection plan. Water-drive operation, it is felt, will recover something over 50 per cent of the oil in place. On the other hand, should the reservoir pressure be permitted to decline to a point below 485 psi., the bubble point of the under-saturated crude, gas will commence to come out of solution in the reservoir.

At this point, recovery would be due to internal gas expansion mechanism, which would recover only 30 per cent or less of the oil in place, or approximately 350 million barrels.

Recovery on this basis, compared with the water drive, would mean a loss of 250,000,000 bbl.

**Water - drive program.** — The North Saskatchewan River flows directly through the southern part of Redwater and offers a plentiful water supply. This water is pure and ideal for water-injection purposes.

Presently the Redwater engineers are investigating further three different plans for water injection:

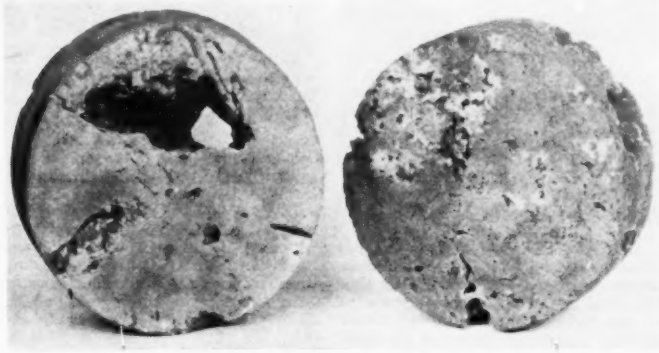
1. Producing the field first without water injection down to a reservoir pressure of 300-400 psi. This is at the equilibrium gas saturation below the bubble point and would bring out free gas in the pores. This action might expel oil in the smaller porous interstices which could then be recovered by water drive passing through the large vugular porosity. Laboratory studies will be conducted to see if this plan will recover any additional oil. Disadvantage of this plan is that all of this production would have to be pumped.

2. This plan envisions fresh-water injection sufficient to maintain reservoir pressure above bubble point, at about 600 psi.

3. Here fresh water would be injected at rates to push the reservoir pressure back to about 1,150 psi., or 100 psi. above the original. Under these conditions it is calculated that all the wells in the field now pumping would flow naturally, provided they produced no water. Since the estimated savings in flowing naturally over artificial pumping runs from $50 to $70 per well per month, an indicated annual saving on 869 wells would be $625,000—a big savings in operating expense indeed.

**Initial action.**—As already mentioned, currently engineers for the Redwater operators are investigating further data applying to the three different water-injection plans, and in any event with some type of water injection being favored by the engineers attending recent conference (June 23-25) where Imperial Oil, Ltd., British American Oil Co., Ltd., Canadian Gulf Oil Co., Western Leaseholds, Ltd., Honolulu Oil Corp., and Seaboard Oil Co. were represented.

In the meantime the engineering committee put forth a recommendation for early formation of a salt-water-disposal company in Redwater, or for Redwater operators temporarily to return produced salt water to D-3 formation through suitable wells. This is felt to be the necessary first step to any ultimate water-injection program, since salt-water-gathering systems and lines will be necessary under any plan.



*REDWATER CORES.—Unusual sample at left exhibits huge vugular opening. Sample at right is more representative and shows smaller vugs and secondary crystallization. These are 3½-in. cores. Redwater's D-3 Devonian reservoir is underlain by water table at 1,236 ft. subsea. The proposed water-injection program would raise this water table in a slow upward-moving piston-like squeeze on the oil reservoir.*

## WEST COAST

# Alaska Search to End

### Materials shortage to halt oil hunt at end of year; Navy reports $30,000,000 profit from all reserves since 1916

WASHINGTON.—The Navy Department plans to terminate its exploration activities in Naval Petroleum Reserve No. 4 on December 31, 1 year short of the programmed finish of its multimillion-dollar search for petroleum in Alaska.

Net results of the Navy's work, a House appropriation subcommittee was told by Capt. R. H. Meade, director of naval petroleum reserves, are an oil field at Umiat estimated by the Bureau of Mines to have 150,000,000 bbl. of recoverable oil but more conservatively estimated by the Navy at 50,000,000; a very small field at Cape Simpson with possibly 200,000 bbl.; and a gas field at Point Barrow of commercial value if in a continental location but usable there only to heat military installations.

Meade told the subcommittee the decision to advance the termination date of the program was made following the President's declaration of a national emergency and the attending critical material shortages. Only in the event the Secretary of the Navy decides the results obtained are very favorable will any further funds be asked to continue the program, he said.

**Profit claimed.** — At the same time, Meade told the subcommittee the Government has shown a profit of $30,000,000 on the naval petroleum reserves from 1916 through the fiscal year 1950. This was due, he explained, to an income from all sources of $90,000,000 and expenditures of approximately $60,000,000, which include the development of Reserve No. 1 (Elk Hills) to its present potential and the proving of approximately 700,000,000 bbl. of reserves in that field, as well as the Alaskan exploration and administration of the other reserves.

In the event of need to put Reserve No. 1 on full production, which would require action by Congress, the present 7,000 bbl. daily production could be increased to 80,000 bbl. — 50,000 from the shallow zone and 30,000 from the Stevens zone, Meade said.

The Government's share of this output would be 44,856 bbl. daily from the shallow zone having a present value of $2.13 per barrel, and 23,793 bbl. from the Stevens zone having a present value of $2.70 per barrel, or a total of $58,321,160 a year from the oil which, with additional income from the sale of gasoline, would bring the total annual revenue to a sum in excess of $60 000,000.

It is estimated that $11,500,000 will be required for Elk Hills field for the current fiscal year, of which $10,650,000 is for exploration and development.

**Gas plant needed.** — Approximately half of the appropriation is sought for construction of a gas-processing plant at a cost of $4,000,000 and necessary gathering lines to serve it at a cost of $1,500,000.

Col. O. F. Kotick, deputy director of naval petroleum reserves, explained that the Navy now has one gasoline plant, about 30 years old, which has a capacity of about 20,000,000 cu. ft. daily and recovers approximtely 1 gal. of gasoline per 1,000 cu. ft. processed. The gas is capable of providing 4 gal. of gasoline per 1,000 cu. ft. so that the loss in the plant even under the present low rate of production is about $580 per day.

In the event of wartime production of 80,000 bbl. of oil per day and 50,000,000 cu. ft. of gas, Kotick continued, the department would need a plant which would effectively recover about 200,000 gal. of gasoline per day. Valuing the gasoline at 6 cents per gallon, this would amount to $12,000 a day, most of which would be lost in unrecovered natural gasoline with the present plant.

The proposed drilling of 54 wells in the Stevens zone and 47 in the shallow zone will take the remaining $5,150,000, Meade said.

The department also asked $300,000 for exploration in Petroleum Reserve No. 3, in Wyoming. Two and possibly three wells will be drilled and the results will determine whether a development program is possible.

Decision to undertake exploration in the reserve follows discoveries in the Dakota sandstone in the adjacent Salt Creek field at a depth of about 5,500 ft. All the wells in the reserve are much shallower and go only to the uppermost oil horizon.

## Merger Discussed

LOS ANGELES.—Plans for the possible merger of Southern California Petroleum Corp. and Trico Oil & Gas Co. were made known here last week.

The proposal has been submitted to the boards of directors of both companies.

Trico owns about 45 wells, all in San Joaquin Valley fields, which currently are producing about 300 bbl. daily. Southern California operates about 28 wells which are producing around 1,300 bbl. daily. Of these 8 are in Morales Canyon, a 1950 discovery in Cuyama Valley, with an output of about 600 bbl. daily. It also has 10 producers in the Ramona pool of Del Valle which are producing about 500 bbl. daily.

## SOUTHWEST

### Crude Line Planned

McALLEN, Tex.—Continental Pipe Line Co. is planning a 110-mile, 8-in. line from Rincon field, Starr County, to Port Isabel.

To date, Continental has not received either a certificate of necessity or Petroleum Administration for Defense approval for the project. If governmental okay is forthcoming, construction of the $2,000,000 line is expected to begin in October.

The line is to be built in two sections. The first, due for completion next year, will be an 87-mile length between McAllen and Port Isabel. The line will later be continued from processing installations in McAllen to Rincon field, probably in late 1952.

Continental is also reported to be making extensive improvement on its existing 143-mile, 5½-in. line from Rincon field to Port Isabel. The line is now moving crude to Conoco's tanker terminal, but when improvements are made, it will carry distillate from Taylor Refining Co. and Mayfair Minerals Corp.'s McAllen plant. Improvements will involve installation of new pumping stations between existing ones, giving a pumping station each 11 miles.

When the Port Isabel-McAllen segment of the line is completed, crude coming from Rincon will be transferred into the new 8-in. line, freeing the old 5½-in. line for carrying distillate.

Ultimate capacity of the new line will be approximately 34,000 bbl. but it will have an initial capacity of only 20,000 bbl.

### Levelland Leases Purchased

DALLAS.—General American Oil Co. has completed a purchase of 74 wells on 19 leases in the Levelland field of Cochran and Hockley counties. The property was acquired from Jules Constantine, E. Constantine, Jr., Texas-Canadian Oil Corp., Southland Oils, Inc., and CCS&R, Inc., all of Dallas.

The deal involves approximately 3,000 acres and some 30,000 bbl. of production per month. Consideration was not disclosed but was reported in excess of $5,000,000.

# Joint Oil Action

## Government, foreign-operating firms set up four-point plan for pooling facilities to replace Iranian crude

WASHINGTON.—Four broad fields of cooperative action have been opened to American oil companies operating abroad to offset shortages resulting from the interruption of Iranian oil operations.

The companies' joint programs will be made under "Plan of Action No. 1" signed last week by Defense Production Administrator Manly Fleischmann on the recommendation of Interior Secretary Oscar L. Chapman.

The plan was developed under the Defense Production Act, which provides immunity from prosecution under the antitrust laws and Federal Trade Commission Act for companies participating in agreements approved by the attorney general. Department of Justice approval will be required for each program set up under the plan.

Need for the plan, it is stated in the agreement, arose from the discontinuance of all movements of crude and products from Iran, resulting in a loss "to free world trade" of about 150,000 bbl. of crude and 460,000 bbl. of products daily.

"As a direct consequence," it was stated, "there is building up a serious shortage and maldistribution of petroleum supplies which is adversely affecting the interests of the United States, including the successful continuance of its mobilization program and the mobilization program of friendly foreign nations.

"To overcome shortages of the magnitude involved, it will be necessary to make numerous alterations and adjustments in foreign petroleum operations, with assistance to one area necessarily involving adjustments in other areas."

**Areas affected.**—The plan listed the principal areas directly affected by the loss of Iranian oil as including Great Britain, France, Germany, Scandinavia, Belgium, Netherlands, Luxembourg, Yugoslavia, Turkey, Greece, Italy, Switzerland, Spain, Portugal, Africa, Aden, India, Pakistan, Japan, Indonesia, Ceylon, Philippine Islands, Formosa, Argentina, French Indo-China, Thailand, Burma, Malaya, Australia, and New Zealand.

A major objective of the companies, acting cooperatively the plan stated, will be "to distribute to the extent possible Persian Gulf-Middle East crude oil (a portion of which is presently being exported to the United States and Canada) and refined products to the areas most accessible thereto, taking account of available refining capacity, and pipeline and tanker transportation. Supply deficits in other areas resulting from such redistribution will generally be made up from the sources of supply nearest at hand."

**The four fields.**—The four fields of cooperative action authorized by the plan are:

1. Increasing crude production in Bahrein Island, Canada, Colombia, Egypt, Indonesia, Iraq, Qatar, Kuwait, New Guinea, Saudi Arabia, and Venezuela.

2. Increasing the production of refined products at some or all of the refineries located in Argentina, Australia, Bahrein Island, Belgium, British West Indies, Canada, Colombia, Cuba, Denmark, Egypt, France, Germany, Indonesia, Italy, Japan, Kuwait, Netherlands, Norway, Netherlands West Indies, Peru, Saudi Arabia, Spain, Trieste, Trinidad, United Kingdom, Uruguay, and Venezuela.

3. Arrangements among the participating companies for the purchase, loan, sale, or exchange of crude oil, petroleum products, and blending agents for distribution in foreign countries.

4. Arrangements for the most efficient use, without regard to ownership, of terminal and storage facilities, tankers, pipe lines, and other transportation facilities so as to minimize duplications, multiple loadings and discharges, split cargoes, crosshauling, and backhauling, and idle time in port.

The plan will be implemented by schedules setting forth in detail the operating procedures to be taken under its terms.

### World's Biggest

**Size of the new fluid catalytic cracking unit being erected for Gulf Oil Corp.'s Port Arthur, Tex., refinery is indicated by this regenerator bottom being lowered into place. The head alone weighs 225,000 lb. and measures 56 ft. in diameter. Throughput of the new installation, being erected by M. W. Kellogg Co., will be 60,000 bbl. per day, largest in the world.**

**Invitations sent.**—Invitations to participate in the plan have been sent by Fleischmann to the 19 oil companies operating abroad which participated in negotiating the agreement and are represented on the committee.

Immediately following approval of the plan Deputy Petroleum Administrator Bruce K. Brown appointed an executive committee and five subcommittees from the participating companies to handle the working out of programs.

Stewart P. Coleman, Standard Oil Co. (N.J.), chairman of the full committee, was appointed chairman of the executive committee, and A. C. Long, The Texas Co., will be vice chairman of both. Nine companies will have representation on the executive committee, including in addition to Jersey Standard and Texas, Caltex Oil Products Co., Gulf Oil Corp., Socony-Vacuum Oil Co., Standard Oil Co. of California, Standard Vacuum Oil Co., Arabian American Oil Co., and Sinclair Oil Corp.

Top appointments made by Brown to the new subcommittees were as follows, Production: Harry McCobb, Standard Vacuum Oil Co., chairman, and Robert L. Boggs, Gulf Oil Corp., vice chairman. Refining: Brian Mead, Standard Oil Co. (N.J.), chairman, and H. B. Nichols, Caltex Oil Products Co., vice chairman. Materials: A. H. Chapman, Arabian American Oil Co., chairman, and George Young, Standard Vacuum Oil Co., vice chairman. Bulk transportation: T. E. Buchanan, The Texas Co., chairman, and Harry A. Britton, Arabian American Oil Co., vice chairman. Overseas liaison: Howard W. Page, Standard Oil Co. (N.J.), chairman.

## New York's Newest

**This is the newly completed Sinclair Oil Building at 600 Fifth Avenue in the Rockefeller Center area of midtown New York. More than 1,000 employes in Sinclair's head offices are scheduled to complete the move into the new building by August 17. Sinclair, which now has headquarters at 630 Fifth Avenue, will occupy nine floors of air-conditioned, soundproofed office space in the new structure, and will have its tourist bureau on the street level. The building was built by Massachusetts Mutual Life Insurance Co.**

## Tanker Tonnage Growing

NEW YORK.—Contracts for 60 new vessels of 739,851 gross tons, including 24 large oil tankers totaling 384,926 tons, greatly stimulated the shipbuilding industry of the United States during the first half of this year, but the outlook for continued active employment of the country's shipping fleet is uncertain.

Walter L. Green, president of the American Bureau of Shipping, told the bureau's board of managers here last week that the United States fleet faces the prospect of increasing competition as a result of the tremendous amount of new shipbuilding by foreign maritime nations. This, he said, was given further impetus during the first 6 months with the contracting for more than 2,000,000 gross tons of new ships of all types. A net increase in world tonnage during the next 3 years of about 35 per cent over prewar is in prospect.

# Industry Briefs

**WASHINGTON.—C. E. Davis, vice** president in charge of refining of Shell Oil Co., has been appointed deputy director of PAD's refining division, and Alton S. Lutz, former vice president of Protane Corp., has been named assistant to the director of the natural-gas production and processing division.

**BATON ROUGE. — An August 15** hearing at New Orleans has been scheduled by Louisiana's Department of Commerce to help set oil and gas daily production allowables for September and October. Producers and purchasers have been asked by S. L. Digby, commissioner, to file data relative to market demand for crude petroleum and natural gas by August 10. This information will be the basis for setting September and October daily allowables, Digby said.

**TUSCALOOSA, Ala.—Oil production** in Alabama continues on the upgrade as half-year reports showed crude output to be almost 70 per cent greater than the same period in 1950. Total output for the first half of 1951 was 484,370 bbl., according to Walter B. Jones, state oil and gas supervisor. This represented an increase of 195,297 bbl. over the same period last year when 289,073 bbl. were produced. June production reached 85,203 bbl., an increase over July, but still short of April's all-time high of 87,330 bbl.

**LOS ANGELES. — Southern Counties** Gas Co. last week announced plans for immediate construction of a $560,000 office building on a 12½-acre site at 4910 Anaheim-Telegraph Road. It will be a three-story reinforced-concrete building. The company now leases offices in two locations.

**AUSTIN.—An application for a per**mit to produce seepage oil from a big pit in East Pecos County has been filed with the Texas Railroad Commission by Dan Purvis, Midland. Purvis said he plans to dig a pit 20 ft deep, 60 ft. wide, and 176 ft. long to recover seepage oil from the Toborg pay. Purvis said the producer will be designated Dan Purvis No. 1 Pit Continental Oil Co.-Yates.

**ANAHEIM, Calif. — The Anaheim** City Council has granted Steele Petroleum Co. a permit to drill a wildcat in the northeast section of the city. The permit provides the city will receive a one-sixth royalty plus a 2 per cent override on production.

**KANSAS CITY.—Howard A. Cow**den, president of Consumers Cooperative Association, last week urged creation of a cooperative operating company to handle Iran's oil industry. He proposed a co-op directorate of three British, three Iranians, and three representatives of consuming countries; fair royalties to Iran for crude oil and products; fair rentals to Anglo-Iranian Oil Co. for tankers and marketing facilities; distribution of earnings to consumers in India, Pakistan, Australia, and elsewhere; and a loan from the International Bank for Reconstruction and Development to supply needed capital.

**ROSWELL, N. M.—Stanolind Oil &** Gas Co. has established a new exploration district office here to conduct exploration and leasing activities in Lincoln, Otero, Debaca, Chaves, Eddy, Roosevelt, and Lea counties. District geologist in the new office is G. P. Crawford, formerly assistant district geologist at Midland.

**BARTLESVILLE. — Phillips Petro**leum Co. will assist in rehabilitating all company employes whose property was damaged by the recent Kansas City area flood. The company said it will contribute money to cover half an employe's loss up to $4,000 and provide a noninterest-bearing loan for the remainder.

**WASHINGTON.—Legislation estab**lishing, that under the Robinson-Patman Act, it is a complete defense to a charge of price discrimination for the seller to show that his price differential was made in good faith to meet the equally low price of a competitor was approved by the Senate last week and sent to the House. The 42-34 vote, however, did not indicate the bill could be passed over the presidential veto it might receive if the House concurs in the Senate action.

**LOS ANGELES.—At Conejo, 20** miles east of Ventura, Nelson & Associates are preparing to drill their fifth well in the 90 to 120-ft. pool discovered early this year. The four producers so far completed currently are averaging about 10 bbl. each daily, with the crude running about 16° gravity. The group hopes to drill about 15 more of these "post hole" producers.

**WASHINGTON.—Edward G. Boyer,** manager of the gas department of the Philadelphia Electric Co., has been named by Interior Secretary Chapman as a member of the Gas Industry Advisory Council.

**WASHINGTON.—Dr. Martin Perez** Matos, for 10 years attorney for Creole Petroleum Corp. in Venezuela who has been serving as alternate delegate to the Organization of American States, has been named counselor of the Venezuelan Embassy in Washington. He succeeds Dr. Carlos Rodriguez Jimenez, who has been transferred to London as consul general.

# ROCKY MOUNTAIN

## Rich Field

### Yenter recovery forecast at 600 bbl. per acre-foot

STERLING, Colo.—Yenter pool, situated 10 miles northwest of this city, looms as one of the richest oil fields found to date along the 100-mile north-south trend in Northeast Colorado and Southwest Nebraska.

Reservoir engineers estimate that 600 bbl. of oil per acre-foot will be recovered ultimately. This figure is predicated on an anticipated water drive in addition to gas-cap expansion. Reserves are estimated at 11,000,000 bbl. for 18,300 oil-saturated acre-feet for this "J" sand reservoir. The overlying gas cap is estimated to contain 5 billion standard cubic feet of gas in place.

In size of producing area, Yenter may be the biggest field in the basin next to Huntsman field to the north in Nebraska. The field may cover as much as 1,400 acres, making it possibly the largest producing area in Northeast Colorado. Currently total field production on a 50-bbl. per day "purchaser allowable" is 950 bbl. per day from 19 wells. However, the field is capable of producing greatly in excess of this amount.

Currently, oil is moved by trucks to Service Pipe Line Co. station at Northport, Neb.

**Reservoir performance.**—Operation of a water drive supplementing gas-cap expansion is suggested from the high producing efficiency to date; bottom-hole pressures have dropped only slightly from the original reservoir pressure of 1,400 psi. since discovery; 95,000 bbl. of oil has been withdrawn to date from the field.

Other reservoir characteristics of the "J" sand are as follows: gas-oil contact, —842 ft.; oil-water contact, —858 ft.; oil column height 16 ft.; average porosity 21 per cent; average permeability, 333 md.; average connate water, 20 per cent of pore space; and gravity of produced oil, 37° to 39° A.P.I.

Drill-stem tests prove the existence of gas with a very thin oil column above the water table in the "D" sand at a depth of 5,100 ft. behind the pipe.

**Drilling activity.**—There are three rigs active in the Yenter field of which two are drilling for the account of British-American Oil Producing Co., the other for McDermott & Barnhart, of New Orleans. Contractors working at Yenter include Pennant Drilling Co., of Denver; Fitzpatrick Drilling Co., of Casper, Wyo.; and Herndon Drilling Co., of Tulsa. Rnoda-Cone Operating Co., of Oklahoma City, has a workover rig in the field.

**Best of series.**—Yenter is the best of a series of discoveries made by British-American in the Julesburg-Denver basin during 1950. Discovery well at Yenter was completed on December 1, 1950, by its 1 Koenigh-Ashby, NE NE NW 3-8n-54w. It was completed for an initial production of 225 bbl. of oil per day from the "J" sand penetrated to a depth of 5,248 ft.

## Solid Crude

### Uinta Tertiary production solidifies at well head

VERNAL, Utah.—Companies looking for Tertiary production in the Uinta basin can expect to find high-pour-point, high-gravity crude oil with a high paraffin-wax content.

Crude from the three major discoveries to date—Roosevelt, Redwash, and Duchesne pools—has a pour point of about 90° and solidifies at the surface in normal atmospheric temperature. (See cut.)

Solidification of the crude necessitates installation of steam coils in field tank batteries and movement to refineries in tank trucks equipped with steaming coils for unloading.

Production from all three fields is from the transitional zone between the Wasatch and Green River formations of Tertiary age.

Analysis of the crudes produced in Duchesne and Roosevelt pools was released this week by Carter Oil Co., which teamed up with Stanolind Oil & Gas Co. to drill the Roosevelt opener and with Continental Oil Co. to drill the Duchesne discovery.

Both crudes show surprisingly good gasoline content and other desirable properties. Qualities of the crudes are shown in the accompanying table.

The Roosevelt pool discovery, 1 Ute Tribal, was completed in mid-1949 for 1,600 bbl. per day at a total depth of 9,392 ft. A second well was completed a year later, and other wells are now drilling.

The Duchesne discovery was completed last week after testing 14 bbl. per hour.

At present, eight wildcats or step-outs are being drilled in the basin.

**ANALYSES OF NEW CRUDES FROM UTAH**

| | —Pool and county— Duchesne-Duchesne | Roosevelt-Uintah |
|---|---|---|
| Color | Yellow-brown | Black-brown |
| Gravity, A.P.I. | 43.1 | 32.6 |
| Vis., S. U. S. at 100° F., sec. | 86 | 133 |
| Pour point, F. | 90 | 90 |
| Distillation: | | |
| Light gasoline, per cent | 8.5 | 5.8 |
| Total gasoline and naphtha | 19.7 | 16.5 |
| Kerosine | 14.0 | 11.4 |
| Gas oil | 19.5 | 10.0 |
| Non-vis. lub. dist. | 14.9 | 12.3 |
| Med. lub. dist. | | 5.2 |
| Resid. | 31.2 | 42.2 |
| Dist. loss | 0.7 | 2.4 |

*SOLID SAMPLES.—Shown here are bottles containing crude oil from the Roosevelt and Duchesne fields, and in front is a "piece" of each sample. The light oil at left is from the recent Duchesne area discovery. At right is black oil from Roosevelt pool. The blobs in front illustrate the tendency of each crude to solidify at the surface and point up the necessity to heat the oil in order to produce or transport it.*

# GULF COAST

## Casing Set at 14,059 Ft.

JACKSON, Miss. — The longest string of casing ever run in Mississippi has been set by Union Producing Co. in its 1 Logan, on the west side of Tinsley field in Yazoo County.

The company set 7-in. pipe at 14,059 ft. in a sidetracked hole in its Smackover test.

Previous Mississippi record was a 14,038-ft. string run in George Vasen's 1 fee, near Wiggins in Stone County.

The Vasen well, only 81 ft. short of becoming the deepest hole ever drilled for oil, for several weeks has been reported fishing at 20,440 ft.

Union Producing's well reached the Smackover at 14,038 ft. in the original hole but blew out while coring at 14,167 ft. A whipstock was set at 12,864 ft. and the hole was sidetracked and drilled to 14,071 ft. before casing was run. The company plans to core into the zone from which the well blew out.

# Crude-Price Hike?

## Brown says increases to July 26 in production costs must be recognized, tells industry to gather facts, seek raise

WASHINGTON.—Domestic producers may take advantage of amendments written into the Defense Production Act by Congress to seek higher ceiling prices on crude oil from the Office of Price Stabilization, it was indicated this week.

A suggestion that such action be started was made to members of the Independent Petroleum Association of America last week by Russell B. Brown, general counsel, who pointed out that the new law contains several provisions "which may be of considerable significance to the petroleum industry."

"Under the old law," Brown explained, "the price control officials disregarded the fact that crude petroleum prices were frozen at substantially the level established in the latter part of 1947, despite the well-recognized fact that since that time costs of material, labor and all items of production have increased very substantially.

"The new law contains a legislative directive that requires that increased costs incurred up to July 26, 1951, must be recognized. This would suggest that the producing branch of the industry should prepare to vigorously present factual information to the price control agency so as to bring about a more realistic attitude of that agency with respect to crude prices."

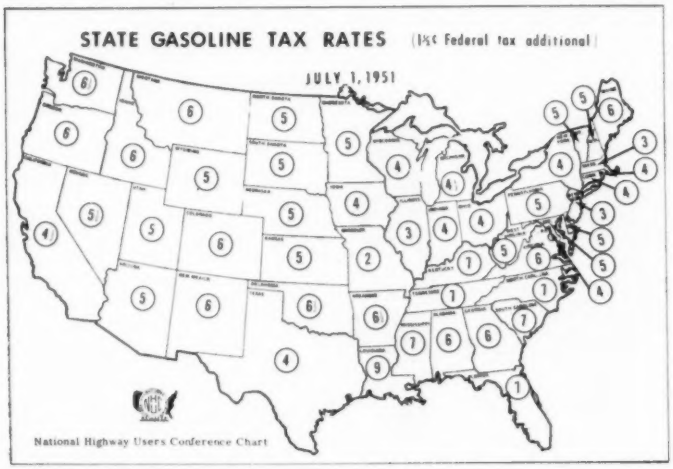
**Other provisions.**—In addition to spelling out the restrictions on the Office of Price Stabilization in fixing ceilings, the act contains other provisions which, under certain conditions, could affect the oil industry. A major amendment barred issuance by the Petroleum Administration of any order curtailing expansion of natural-gas service in any state where a state regulatory agency was exercising its authority to restrict expansions.

One section of the law extends the authority of the President to purchase raw materials to the purchase of materials generally and provides that purchases and commitments to purchase may be made for periods extending up to June 30, 1962. This provision, it is pointed out in industry circles, could enable the Government to sponsor commercial synthetic-liquid-fuel production by long-term purchase contracts, and may also be of value in securing the increase in alkylate facilities sought by PAD and the armed services.

Another provision would permit the payment of subsidies on domestically produced nonagricultural raw materials where the President finds that under generally fair and equitable ceiling prices a decrease in supplies from high-cost sources of a material will result and that such supplies must be continued to carry out the mobilization program. The President also is given authority to make subsidy payments to cover a temporary increase in the cost of transportation, such as was incurred by the industry last year in meeting Interior Secretary Chapman's request for channeling of all possible components to refineries producing aviation gasoline.

**What was left out.**—From the standpoint of industry, the denial by Congress of many powers requested by the President was as important as the provisions which went into the new law.

Among the authorities which the President sought and did not get, for instance, were the power to acquire plants by condemnation or build government plants, to create new government corporations, to make unlimited defense loans, to control certain public utility and common carrier rates, to establish the CIO national production council plan which would have provided for consumer, labor and agricultural, as well as industry representation on OPS advisory committees, to impose federal licenses on all business, to use information obtained from business under pledge of secrecy in formulating legislative plans, and to discontinue government statistics whenever deemed advisable by the President.




### Why Gasoline Isn't Cheap

**What each state collects in taxes from each gallon of gasoline sold is shown in this chart, prepared by the National Highway Users Conference. It bears out the well-worn reminder of the oil industry to the consuming public: "Gasoline is cheap; only the tax is high." As the chart shows, Louisiana heads the tax list with 9 cents per gallon. Since the federal Government collects an additional 1½ cents, Louisiana motorists pay a total of 10½ cents tax for each gallon of gasoline used.**

## Quick Tax Writeoffs O.K.'d

WASHINGTON. — Certificates for accelerated tax amortization issued last week by the Defense Production Administration brought the total amount of such allowances to $8,500,000,000.

Included in the latest list were certificates to Warren Petroleum Corp. for quick writeoff of 75 per cent of a $1,585,570 investment in propane facilities in Major County, Oklahoma *(See page 123)*; to Gulf Refining Co. for 80 per cent of $292,216 in heptene facilities at Cleves, Ohio; and to Gulf Oil Corp. for 80 per cent of $704,756 for production of isooctyl alcohol at Port Arthur, Tex.

Certificates also have been granted to the St. Charles Pipe Line Co. for 80 per cent of a $992,798 natural-gas pipe line in Aransas and San Patricio counties, Texas; Westoil Rich-

mond Terminals Co. for 75 per cent of $494,526 for gasoline storage at Richmond, Calif.; Hewitt Oil Co., for 75 per cent of $371,515 for gasoline storage at North Charleston, S. C., and Tide Water Associated Oil Co. for 50 per cent of $2,265,872 for petroleum storage at Bayonne, N. J.

# Lube Prices Curbed

## New orders place wholesale prices of all petroleum products not already covered under formula controls

WASHINGTON.—Wholesale sales of lubricating oils, greases, and other petroleum products not covered by other regulations were put under formula price control this week by the Office of Price Stabilization.

The order, CPR 63, is temporary and eventually will be superseded by dollar-and-cents prices to be fixed for individual items in the principal markets.

The ceiling prices for the products covered will be those provided by the general ceiling-price regulation, with the base period set at December 19, 1950-January 25, 1951. However, the new regulation defines the highest base-period price so as to exclude from ceiling calculations sales which were made pursuant to preexisting contracts and were not adjustable to reflect market conditions.

**Hardship adjustments.**—The order thus incorporates the principle of setting ceiling prices in accordance with market conditions current in the base period. However, it permits sellers to apply for adjustments when temporary conditions have caused prices to be frozen at levels inconsistent with customery pricing practices or price relationships.

It also permits sellers purchasing costs of components and containers on which prices have risen more than 5 per cent between June 1, 1950, and March 15, 1951, to adjust their ceilings to reflect those increases. But in computing the amount added, increases in selling prices since June 1, 1950, must be deducted, and sellers using this provision must cut their ceilings when purchased component or container costs decline by more than 5 per cent. This provision is aimed at restoring and maintaining dollars-and-cents margins prevailing just before the Korean outbreak.

The stipulation for a swing of at least 5 per cent before ceilings may be changed, OPS explained, is based on the desirability of preventing every cost move, no matter how insignificant, from being reflected in ceiling prices. It is also based on the customary practice of the industry to hold consumer prices stable within tolerable cost-variation limits.

In addition the regulation deals with the problem caused by the growing scarcity of steel containers indispensable to petroleum-products distribution. It permits a uniform-deposit charge of $10 for 55-gal. drums by sellers who now call for container return for scarcity reasons.

The drums had a value to ultimate purchasers during the base period, it was pointed out, and the regulation provides allowances for the loss of value involved in their return. This conforms to ceilings established for used steel drums by CPR 36.

The order also outlines methods for establishing ceiling prices for new products developed by this segment for the petroleum industry which, OPS commented, characteristically introduces many new items for improving industrial processes and meeting novel and exacting engineering requirements.

**Asphalt ceilings.**—In another order, CPR 66, OPS established ceiling prices for sales of asphalt products at all levels of distribution, completing the removal of all petroleum products from the general ceiling price regulation.

The regulation became effective August 6. In general, it sets the ceiling prices on the basis of the highest price charged by sellers to purchasers of the same class during the base period August 1, 1950-January 25, 1951.

OPS explained that extending the base period for asphalt pricing back to last August 1 permits a basis on which more representative prices can be established.

The December 19, 1950-January 25, 1951, base period used for other petroleum-product pricing is not considered a sound basis for asphalt, the agency said, since the bulk of asphalt is sold for construction purposes between April 1 and October 15 and the longer base period will cover sales in sufficient volume to determine representative prices.

## Defense Orders Issued

WASHINGTON.—The following orders have been issued by the defense agencies:

**Office of Price Stabilization**

**CPR 63,** July 31: Establishing ceiling prices for lubricating oils, greases, waxes, etc., at wholesale.

**CPR 57,** July 31: Establishing wholesale and retail price ceilings for antifreeze.

**CPR 66,** August 1: Establishing ceiling prices for asphalt products at all levels of distribution.

**National Production Authority**

**Direction 2 to M-47A,** July 27: Providing for adjustments of second-quarter allotments of steel, copper, and aluminum by manufacturers of consumer durable goods.

**Amendment to M-67,** July 27: Broadening the control on aluminum foil to all types except insulation foil.

**Direction 5 to CMP Reg. 1,** July 30: Providing that controlled materials ordered for second-quarter delivery but not delivered until the third quarter shall not be deducted from the purchaser's third-quarter allotment.

**Amendment to M-19,** July 30: Easing the restrictions on the use of cadmium.

**Amendment 2 to CMP Reg. 1,** August 1: To eliminate certain improper scheduling methods followed by some controlled materials producers.

**Amendment to M-47A,** August 2: To provide greater flexibility in the use of iron and steel quotas for consumer goods.

**Direction 2 to M-1,** August 2: Changing the lead time for carbon-steel products for September and regulating the acceptance of rated orders.

**Direction 2 to M-6,** August 2: Setting the percentages of iron and steel required to be shipped to distributor customers in October.

# Pipe Permits Out

## About half of fourth quarter requests o.k.'d

WASHINGTON.—Fourth-quarter authorizations for procurement of oil-country tubular goods have now been sent to all oil and gas operators, and the Petroleum Administration for Defense has called upon operators to submit their first-quarter, 1952, applications as soon as possible.

Applications for drill pipe must be filed with PAD by September 15 and requests for casing and tubing by September 30, Deputy Administrator Bruce K. Brown announced.

New forms PAD-15, 16, 17 and 17DP are now being drawn up, however, and Brown suggested that applications be withheld until they are available—probably within a week or 10 days.

**Too many requests.**—Brown disclosed that of the 2,469 requests received for fourth-quarter authorizations, 1,349 were granted and 1,120 were disapproved. The casing and tubing granted by the authorizations totaled approximately 300,000 tons in addition to 25,000 tons of drill pipe earlier authorized for delivery.

Commenting on PAD's inability to grant all applications, Brown said that the requests for steel for the fourth quarter totaled approximately

1,158,000 tons—enough to drill 26,000 wells or almost 2½ times the 11,000 programed for the quarter.

"It is significant that even with the limited quantities of steel available, the oil industry is meeting PAD's expansion goal," Brown commented.

Brown backed up his statement with figures showing that by July 14 4,903 wildcat wells had been sunk in the United States against only 3,933 in the same period last year. The 24.7 per cent increase in wells, however, was surpassed by the number of discoveries last year, which in the same period were 946 against 708, an increase of 33.6 per cent.

"This record of increase is proof that the industry has taken advantage of PAD's emergency pool, under which 5 per cent of the available steel tonnage in casing and tubing was set aside in specially designated regional warehouses for wildcat drilling," Brown declared. "It is also a justification of the establishment of that pool in April to insure that the tubular goods would be available for the needed expansion in exploration and discovery."

Total well completions this year also compare favorably with 1950, Brown said, totaling 22,096 so far against 21,991 a year ago.

## Personnel Help

### PAD to seek deferment of key oil-industry employes

WASHINGTON. — With the labor situation throughout the country rapidly becoming more difficult, Deputy Petroleum Administrator Bruce K. Brown is prepared to assist the oil and gas industry in seeking deferment or delay in service for key personnel.

But, Brown warned in a statement of PAD policy, such assistance will not be forthcoming until all normal procedures for appeal have been exhausted. Help will not be given in the case of graduates of the service academies or recent graduates of reserve officer training corps programs, cases involving only hardship to the individuals concerned, or cases in which the person sought to be deferred does not know of and approve the application for special consideration.

PAD assistance will be given only in the case of key managerial or executive officials, men in an occupation included in the Labor Department list of critical occupations, or men in the production of oil-field equipment and machinery, tetraethyl lead, catalysts, lube-oil additives, or similar items for which PAD has responsibility. They must be men who are engaged full time in an essential activity, are irreplaceable without material loss of effectiveness in the activities in which they are engaged, and are adequately trained for the work in their occupation.

## WATCHING WASHINGTON

**Bertram F. Linz**

### Small Pipe Scramble

One of the most difficult items of supply for the oil industry is small-diameter pipe for use by seismograph crews.

Seismograph operations require 2⅜-in. pipe. So, it appears, does every other operation turing out products for the military.

PAD has not had a specific allocation of this size pipe from the Defense Production Administration and is now trying to get one. There are probably close to 500 crews working and a lack of pipe threatens to halt operations for many of them.

The trouble is that orders for pipe frequently are placed with the mills, then other orders accompanied by directives come in and the seismograph order is "bumped off." PAD wants a few priorities of its own to insure that pipe supplies will be forthcoming as needed.

### Steel Speculation

Petroleum Administration for Defense officials express confidence that the oil and gas industry will get the full 1,800,000-plus tons of steel allocated to it by the Defense Production Administration for the fourth quarter. Indications are seen in other quarters, however, that DPA may have so badly overreached itself that none of the industries receiving allocations will get what they expect.

Men in the steel, automobile, and other industries charge that the Controlled Materials Plan has been badly messed up, largely because DPA has no absolute figures as to either production or consumption. Of all the industries submitting requests for steel, probably only oil made a complete documented showing of its needs.

The total allocations made by DPA amount to about 24,000,000 tons of steel against which it estimates a fourth-quarter supply of 21,000,000 tons. But there is grave doubt that the industry will produce more than 19,000,000 tons due to an increasing shortage of scrap.

Industry generally is very dissatisfied with CMP, and government officials are beginning to recognize the need for overhauling. The most important recommendation now before DPA—reportedly emanating from very high sources is that CMP be restricted to the military and supporting programs and basic industry expansion which would permit steel mills to make workable schedules.

### New Gas Law?

The Federal Power Commission didn't say anything about it publicly, but several weeks ago it quietly recommended to Congress enactment of legislation stating definitely that local distributors of natural gas are not subject to FPC regulation.

Coupled with its 4-to-1 decision that Phillips Petroleum Co. is not a natural-gas company, this indicates that the commission now favors federal regulation only of interstate transporters of gas.

The suggested legislation would overrule the Supreme Court decision in the East Ohio case. However, until Congress takes action, the commission said in a recent opinion, it will have to follow that decision in dealing with similar cases.

There is no good reason for subjecting the intrastate distributors to dual controls, the commission said, and the legislation would create no regulatory gap.

Commissioner Thomas C. Buchanan, lone dissenter in the Phillips decision, went along with the majority in supporting the legislation.

### Flood Dislocation

The recent floods in the Midwest were more than a local disaster. Their effect will be felt in all sections of the country and by all industries, including oil.

The direct cost of the floods was in loss of life, crops, and property. The indirect cost may include a slowing down in the expansion of defense production.

The high waters wiped out a considerable volume of production facilities in the immediate area, including oil facilities. Much will have to be rebuilt before operations can be resumed, and it is this rebuilding, with its demand for steel and other scarce materials that will affect industry nationally.

It is imperative, of course, that production in the flood area, which includes a number of important industrial centers, be restored as quickly as possible—not only to get needed defense materials but to keep people employed.

Officials in Washington are frankly worried about the problem, which may necessitate extensive shifts in plans for distribution of steel, copper, and other materials.

Applications for deferment assistance will be handled by the manpower division of PAD. The establishment of a policy on assistance was requested by the National Petroleum Council, whose spokesmen said they were chiefly concerned about the possible calling up of technical and professional men engaged in exploration, refining, and research and development work.

## Sulfur Stepup

### Annual oil-industry output exceeds use by 5,000 tons

WASHINGTON.—The domestic oil industry is making what is slated to become a major contribution to the sulfur supply, now so seriously short that world supplies have been pooled for controlled distribution.

The industry now is producing 5,500 tons more a year than it is using for its own operations, and has firm plans that will shortly increase the nation's supply by 190,000 tons a year, it is shown by a survey just completed by the Petroleum Administration.

This contribution to the over-all supply will be made in spite of the fact that the industry is itself one of the major consumers of sulfur, last year taking over 12 per cent of the total United States consumption of sulfuric acid and figuring its needs for acid this year at 638,000 long tons of sulfur.

The PAD survey showed that through acid-recovery and sulfur-extraction operations the industry is directly reclaiming the equivalent of 170,000 long tons of sulfur annually. The equivalent of another 133,000 tons is obtained from spent acid and acid sludges, and hydrogen sulfide recovered from petroleum operations represents the equivalent of 340,500 tons. Thus, the industry this year will release 643,500 tons of sulfur through its own operations, or 5,500 tons more than it will consume.

PAD reported that every effort is being made to further increase the amount of sulfur reclaimed, and construction already started or firmly planned will provide approximately 190,000 tons more by the end of 1952.

In the light of the favorable record of the industry, probably the only one to return more sulfur than it consumes, PAD has urged the National Production Authority not to reduce its sulfur allotments.

### Steel for Cans Promised

WASHINGTON. — Tin can manufacturers will get a minimum of 1,000,000 tons of steel each quarter beginning October 1, which will permit the production of cans for motor oils at a rate of 90 per cent of output during a base period not yet fixed.

Assurance that can manufacturers will get at least this much steel, and more if the availability of the metal and the needs of all steel-using industries permit, was given by National Production Authority officials.

Can uses will be classified according to importance and production for those uses will be rated accordingly. Production of cans for foods and certain chemicals and drugs will be permitted at a rate of 100 per cent or more of base-period output. Motor oils will be in a second group, with a 90 per cent limit, and less important items will be in a third group, limited to 70 per cent.

## Military Needs

### Plan for increasing output of alkylate is presented

WASHINGTON.—The armed services will require approximately $458,000,000 for oil fuels and lubricants for their projected operations during the current fiscal year, it is disclosed by testimony before the House Appropriations Committee.

Well over half of this total, $273,518,000, was asked by the Air Force. The Army estimated its needs at $106,913,000, and the Navy asked for $77,988,000.

Unlike the other services, the Navy outlined its oil needs in terms of barrels. Its "planned" operations for which these figures were given, however, would be some $113,000,000 in excess of actual requirements for which the money was asked.

**Refining program.** — An $85,000,000 program to provide an additional 31,000 bbl. daily alkylate production for aviation gasoline through rehabilitation of existing plants and construction of new ones was laid before the committee. Designed to be carried out within a year, this program would boost alkylate production from a present 127,000 bbl. daily to about 158,000 bbl. daily by July 1, 1952.

The government money would be insurance that refiners making investments in alkylate facilities would not suffer financially in the event the need for the product drops in a year or two. There is little use for such plants in peacetime. Those constructed during the war were idled at its close, and so far only a few have come back into operation.

The cost of the project would be borne jointly by the Navy and Air Force.

Explaining how the plan would work, Col. W. J. Worcester, deputy executive secretary of the Munitions Board joint petroleum committee, said it is proposed to make contracts for a definite period of years with refiners under which the latter will use their own funds for the production of additional capacity and sell the gasoline to the services at a determined price, subject to some reasonable escalation clause, and to include normal depreciation for capital cost.

If the services do not require all his output, a refiner might use the additional capacity for other services, subject to quick return for military supply if needed. Or a refinery may hold the additional capacity in stand-in condition, with the Government to stand the cost of maintenance.

Upon termination of the contract, the then net book value of the capacity rehabilitated or constructed would be determined and a procedure would be provided for determination of the reasonable prospective value of the facilities to the refiner and the difference, if any, between such prospective valued and the net depreciated cost would be paid to the refiner.

## MEETINGS

### Gas Short Course Scheduled

MORGANTOWN, W. Va.—The eleventh annual Appalachian Gas Measurement Short Course will be held at University of West Virginia here August 27-29, Hardin R. Harmer, secretary, West Virginia Oil and Natural Gas Association, announced this week.

The school is conducted by the university in cooperation with gas-utility companies and meter manufacturers operating in the Appalachian area.

### 18,000 Chemists to Meet

NEW YORK. — More than 18,000 chemists and chemical engineers from 42 countries will meet here September 3 for a 2-week World Chemical Conclave—the largest chemical gathering ever held.

Advances in fields of research that have far-reaching effects on the future of the human race will be reported at the conclave, which will open with the Diamond Jubilee meeting of American Chemical Society. It will also include the sixteenth conference of the International Union of Pure and Applied Chemistry and the twelfth International Congress of Pure and Applied Chemistry.

### S.A.E. Completes Plans

SEATTLE.—Plans have been completed for the West Coast meeting of Society of Automotive Engineers, which will be held at the Olympic Hotel here August 13-15. A number of papers relative to design and performance of engines will be presented. Among them will be:

"Turbosupercharging of High Speed Diesel Engines," "The Where and Why of Engine Deposits," and "Filtration of Fuels and Lubricants, Internal Combustion Engines — Gas, Diesel, and Propane Gas."

MIDDLE EAST

# Oil Talks Resumed

## Future of Iranian oil industry hinges on outcome of new negotiations reputed to be final British effort

Dahl M. Duff

WHAT will undoubtedly be the final British attempt to reach a negotiated settlement of the oil issue with the present Iranian Government is scheduled to take place in Teheran this week.

A high-level British Government delegation headed by Minister Richard R. Stokes and including officials of Anglo-Iranian Oil Co., Ltd., arrived in the Iranian capital over the week end.

The Iranian offer to resume discussions of the nationalization problem and the British decision to accept it in the face of the complete failure of the negotiation attempt 2 months ago, resulted from the efforts of W. Averill Harriman, President Truman's special representative.

The future of the Iranian oil industry hinges on the outcome of the negotiations. If discussions fall through again, then the Iranian Government in all probability will be left with a billion-dollar property which it cannot operate principally because of a lack of tankers to move the production.

**Abadan idle.**—The world's largest refinery, the 500,000-bbl. daily Abadan plant, shut down completely last week for the first time since 1918. Since late June when exports ceased after the British refused to give receipts for the oil, the refinery has been running at a progressively lower throughput.

The last of the distillation units still running—known in company terminology as Bench 80—was shut down. The single distillation unit at Abadan could have been kept in operation but only for a short time longer even at a "trickle" of the normal production rate. The plant's capacity to store motor fuel was the determining factor in the final shutdown. It is estimated that it would take at least a month to get the refinery back in full operation.

An even greater period would be required to reroute the Anglo-Iranian tanker fleet which has now been diverted to other parts of the world. More than 14,000,000 bbl. of products are now piled up in storage at Abadan with the only outlet being the relatively small needs for internal consumption in Iran.

Formal negotiations between the Stokes mission and Iranian officials were expected to get under way the middle of the week. Harriman was urging that first efforts be directed toward working out a temporary arrangement for an early resumption of operations. However, the British were not prepared to reassemble their tanker fleet and return to Abadan without a long-term settlement.

Iranian Premier Mossadegh was on the defensive in the Iranian Parliament from attacks from extremists who declared that the resumptions of negotiations amounted to a "sellout." Mossadegh took credit for averting 42 years of controversy even before the talks had begun—a reference to the fact that the abrogated concession had until 1993 to run.

Stokes was scheduled to visit the Abadan area itself the early part of this week to investigate conditions under which the curtailed British staff is working. The Iranian Government was making some effort to ease the pressure on the British there.

It was announced Hussein Makki, leading member of the "take over" mission, would return to Teheran for medical treatment. However, there was some question as to whether he would leave the oil area immediately.

**Intensified effort.**—For urgent political as well as economic reasons, the new British Government delegation is expected to make every effort to arrive at some settlement in the discussions now commencing. The British are ready to concede the principle of nationalization but are firmly resisting summary expropriation of Anglo-Iranian's properties.

On the Iranian side, a somewhat more moderate attitude appears to be developing. Credit for part of this at least is given to Harriman and his assistant, Walter J. Levy, New York petroleum consultant, who accompanied the presidential envoy on his trip. In a series of meetings in Teheran, Levy is said to have convinced the Iranian leaders of the insurmountable difficulties they face without some measure of participation by the British.

Harriman first presented the Iranian invitation to the British, then flew to London to clarify the offer. Messages went back and forth between London and Teheran, and Harriman last week returned to Iran to remain on the scene as the two groups meet across the conference table. During all these maneuvers, there was no disclosure of the exact basis on which the two sides are being brought together.

**Colombian pattern?** — Assuming the British and Iranians are able to come to terms, the type of operation decided on might resemble that worked out by International Petroleum Co., Ltd., and the Colombian Government to handle the legally reverted De Mares concession. Here, International provides technical assistance in connection with production and operates the concession refinery under lease.

In the Iranian negotiations, the position of the Iranian Government gains from the fact that both the United States and Britain want to avoid letting the oil dispute result in loss of Iran to the non-Communist West. From the economic point of view, a continued shutdown of the oil industry could lead to unrest and ultimate chaos in Iran. For Britain, the loss of its largest foreign investment means a net drain of about $1,000,000 daily on its dollar resources.

Stokes is Lord Privy Seal and as such is minister without portfolio, acting as personal assistant to the British prime minister. He is to be accompanied by Sir Donald Ferguson, permanent secretary of the Ministry of Fuel and Power as well as other company and government officials.

**Russian incident.** — Considerable excitement was caused last week when the Iranian Government announced that one of its Caspian Sea frontier posts had fired on a Russian naval vessel. Extremist nationalists in Teheran said the present British destroyer patrol off Abadan had encouraged the Russians to a similar "show of force."

At Abadan, it was reported that Iran had stopped pipe-line movement of fuel oil from Kermanshah to Iraq in a dispute over payment. These deliveries have been averaging about 2,000 bbl. daily. In Abadan itself, a faulty switch was blamed for a fire which broke out in a refinery office. The blaze was brought under control by company firemen.

Encouraging progress was reported last week in closing the gap in world-oil supplies caused by the loss of Iran's production. By the end of the week, Asiatic Petroleum Corp. (Shell) had made purchases of oil totaling nearly 30,000,000 bbl. These shipments, consisting mainly of products from the United States and crude oil from American suppliers in the Middle East, are for lifting through the remainder of this year.

Heavy stocks in the United States facilitated the buying program. Main effort was being directed toward diverting to Europe the more than 200,000 bbl. daily of Middle East crude which has been entering the United

States and Canada. This oil is to be switched to utilize spare refining capacity existing in Europe. The problem in this connection was finding the right kind of crude and arranging shipping to replace that coming from the Middle East.

## Big Crude Unit

### Distillation plant handles 72,000 bbl. in initial run

BAHREIN PETROLEUM CO.'S new distillation equipment at its Bahrein refinery has taken its place among the larger crude units of the industry after a successful initial run of 8 months.

The first 8 months of operation resulted in the processing of 17,570,000 bbl., or an average of more than 72,000 bbl. daily. The Bahrein refinery has had a listed capacity of 155,000 bbl. daily, though throughput has been substantially above this figure.

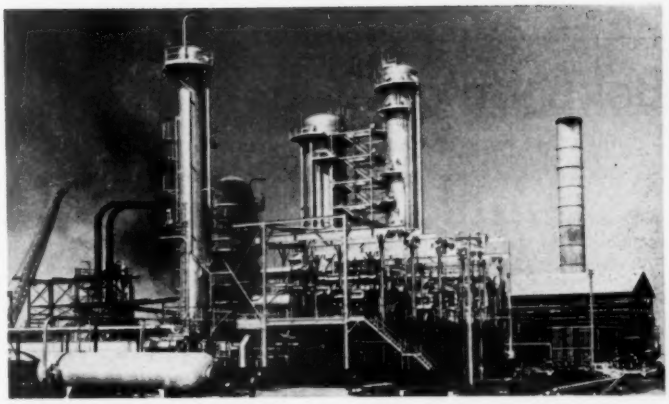
A portion of the refinery's catalytic-cracking unit fractionating equipment had been used earlier for crude-oil distillation on a temporary basis pending completion of the new distillation unit *(The Oil and Gas Journal, December 22, 1949, page 154)*.

The new unit was designed to operate in conjunction with an existing vacuum distillation unit and produce a wide range of closely fractionated straight-run products from Saudi Arabian crude.

**Operating data.**—The crude still is a preflash type of distillation unit in which whole crude is first fractionated at a pressure of approximately 60 psig. A light gasoline of from 180° F. to 270° F. end point is taken overhead from the preflash column and routed to a stabilizer within the unit limits for vapor-pressure control before going to treating and blending. Two naphtha side cuts are taken from the preflash column and used for gasoline blending, reformer charge, or jet-fuel manufacture.

A unique feature of the preflash column is that it includes two flash zones, upper and lower, separated by stripping trays. Crude feed to the preflash heaters is split, the portion entering the lower flash zone being heated to a temperature such as to produce a high percentage of overflash. Vaporized material from this zone strips off light ends contained in the liquid coming down from the upper flash zone, the feed to which has been given only a nominal amount of overflash. Bottoms from the preflash column are fractionated in an atmospheric tower, which produces kerosine and diesel distillates and bottoms for charge to the vacuum unit.

Among the unusual features of this crude still, it may be noted that the combination preflash and atmospheric heater is the largest known process furnace ever designed and built when considered in terms of heat release on a single setting. The heater is an atmospheric draft design and includes a convection section and steam superheater in addition to end-fired radiant sections.



*FIRST RUN SUCCESSFUL.—Bahrein Petroleum Co.'s big distillation plant which processed 17,570,000 bbl. of crude during its first 8-month run, an average of 72,000 bbl. daily.*

Constructed immediately adjacent to an existing vacuum unit, the new crude still was designed for integrated operation with this unit. Construction work was done without interrupting the vacuum unit operations, and final tie-ins were made during a scheduled maintenance shutdown of the vacuum unit. The integrated operation of these two units made necessary a thorough study of the heat-exchange picture with an eye toward most advantageous use of existing equipment. As a result of this study, it was decided to install steam-generating equipment for waste-heat recovery.

**Feed-water problem.** — Vertical thermosiphon-type shell and tube units having double tube sheets and U-tube bundles were provided for steam generation, the heat being supplied by a kerosine stream from the atmospheric fractionator. Bad feed water available in Bahrein leads to heavy scaling, and it is necessary that the units be subjected to a rather severe thermal descaling cycle in operation. The thermal strains encountered in this descaling operation have proved too severe for the conventional single tube sheet and floating-head equipment to withstand. Hence, the U-tube and double tube sheet construction was decided upon in order to provide satisfactory assurance against leakage either of feed water and dissolved solids into the hydrocarbon stream or of oil into the steam system.

## International Briefs

**The New Zealand Ministry of Works** is in the market for drilling equipment to be used in connection with geothermal-steam investigations to be undertaken in New Zealand. Requirements include two heavy-duty, portable, trailer-mounted drilling rigs, diesel mud pumps, and auxiliaries.

**Exploration to determine the petroleum** possibilities of Greenland is being discussed in Denmark. Indications of oil on the island, a Danish colony, have been found as far back as 1938 in the northwestern sections. A report from Copenhagen said that if the exploration program materializes, the capital would be furnished mainly by private interests.

**A decision to extend the exploration** program in Papua was reached recently at a conference of officials of Anglo-Iranian Oil Co., Ltd., and Standard-Vacuum Oil Co., according to a report from Brisbane, Australia. A third seismograph party will be put in the field as soon as possible by Australasian Petroleum Co., Pty., Ltd. (the joint Anglo-Iranian and Standard-Vacuum operating company), and the work now being carried on in the vicinity of Wana will be expanded.

**An agreement for the construction** and operation of a 12-in. pipe line to move coal gas from the Saar and Lorraine to Paris has been signed by a group of French companies in the gas, coal, and steel industries. The line, to be completed late in 1953, will save 1,000,000 tons of coal annually heretofore imported for the Paris gas works. A second 12-in. line is to be constructed within the next 5 years, and the two lines together will supply about 50 per cent of the gas needs of Paris.

# Baku Below Quota

## All is not rosy in Russia's oil picture; Azerbaidzhan leader takes industry to task for not hiking production

THE shortcomings of the Russian oil industry in the important Soviet republic of Azerbaidzhan, which includes the Baku fields, were brought to the attention of the workers in a recent speech by M. D. Bagirov, head of the Azerbaidzhan Communist party, at a party congress.

The speech, translations of which have now become available in this country, is full of the familiar type of self-criticism indulged in by Communist party functionaries in Russia in an effort to whip up production and bring about improvements in various fields of activity. At the same time, they provide significant clues to the condition of the Russian economy.

Azerbaidzhan borders Iran on the south. Much Russian propaganda to Iran cites Azerbaidzhan as an example of what Iran could accomplish if free from "western domination." The Bagirov speech, however, indicates the Russians themselves still have much to accomplish before they achieve a smooth-working economy.

Baku has long been Russia's principal oil-producing area, though in recent years it has been somewhat overshadowed by the new areas developed north of the Caspian Sea and between the Volga River and the Ural Mountains. Last year an estimated 315,000 bbl. daily, or about 42 per cent of total Russian oil production, came from the Apsheron Peninsula which adjoins the city of Baku in Azerbaidzhan.

Bagirov demanded improvement in all phases of the republic's economy. He denounced peasants who seek to serve their own ends rather than those of the collective farms. Industrial production in almost all lines, he declared, was far from satisfactory.

**Party leader's statement.** — His remarks on the oil industry, as translated by the Current Digest of the Soviet Press in this country, follow:

"Often content with fulfillment of plans, our executives and party officials do not thoroughly analyze the economics of the enterprise and the details of all labor processes; they do not concern themselves with the perspectives of development their enterprises offer. It is precisely for this reason that we have not had a sharp advance recently in the most important branch of our republic's economy, the oil industry. Yet the republic has all the necessary conditions for a sharp increase in oil output.

"To attain this advance, we must above all improve exploration and require of our geologists more intensive work and a more conscientious attitude. Drilling is in a bad way. The plan for exploratory drilling was fulfilled 82.2 per cent in 1949 and only 77.1 per cent in 1950. Speed of drilling is low, both in development work and particularly in exploration; as a rule, after drilling is completed, testing for oil is not done promptly.

"All this occurs at a time when drilling methods and equipment have taken great strides, when turbine, multiple-zone, double-bore, and directional drilling are used and when rapid drilling methods are available. A major reserve tantamount to opening up large new fields, can be tapped by secondary-recovery methods. Executives of oil trusts treat this important matter utterly unsatisfactorily. It also must be said that the Ministry of the Oil Industry for some reason does not display particular zeal in this matter. Idle wells constitute a tremendous unutilized reserve. In 1950, the Azerbaidzhan Oil Trust failed to fulfill the plan for putting idle wells into production.

"We must pay particular attention to fighting against losses incurred in producing, storing, and transporting oil. Several hundred thousand tons of oil could be saved each year by the Azerbaidzhan Oil Refineries Trust and the Azerbaidzhan Oil Trust. This is considerably more than we have pledged to produce above plan this year. Finally we have sufficient known and established pools of oil reserves to raise production 150 to 200 per cent and to assure uninterrupted operation of the republic's oil industry for several decades.

"The republic's oil-refining industry fulfilled its plan 101.8 per cent in 1949 and 101.5 per cent in 1950. Of nine oil refineries, eight fulfilled their plans and their socialist pledges. The best results were attained by personnel of the Stalin, Andreyev, Sturua, and Dzhaparidze refineries. Along with this, there are serious shortcomings in the work of the Azerbaidzhan Oil Refineries Trust. The plan is not fulfilled for the entire variety of products. Of 89 petroleum products, production fell short of plan for 26. Last-minute rush and breakdowns still occur at the refineries, leading to uneven production and delivery of products.

"Personnel of plants producing oil machinery (equipment) successfully fulfilled the plans for gross output in 1949 and 1950. As a result of the introduction of new equipment and of improved organization of production and the technological process, labor productivity in the Azerbaidzhan Oil Machinery Trust increased 56.7 per cent in the 2 years (prior to January 1951). Unit production costs dropped 16.8 per cent in 1949 and 17.8 per cent in 1950. At the same time, there are many substantial deficiencies. Equipment plants have not achieved an even rate of production. Average output in the first third of each month in 1950 constituted 14 per cent of the month's total, output in the second third amounted to 22 per cent, and in the final third, to 64 per cent.

"The defects and shortcomings in the work of the Azerbaidzhan oil industry are typical of many organizations in the republic's industry and transportation."

## Fawley Opening Scheduled

Esso Petroleum Co., Ltd.'s new 126,000-bbl. daily refinery at Fawley, Southampton, England, will be formally opened by British Prime Minister Clement Attlee September 14.

It was announced last week in London that the prime minister has consented to perform the official opening ceremony. This will include the unveiling of a silver commemorative plaque specially designed for the occasion by one of Britain's leading silver craftsmen. Invitations for the affair are being extended to prominent representatives of industry and commerce.

The Fawley refinery will be the largest single processing installation in Europe. One of its two distillation units went on stream several weeks ago, and the remainder of the refinery is nearing completion. Process equipment includes a catalytic unit of a charging capacity of about 41,000 bbl. daily.

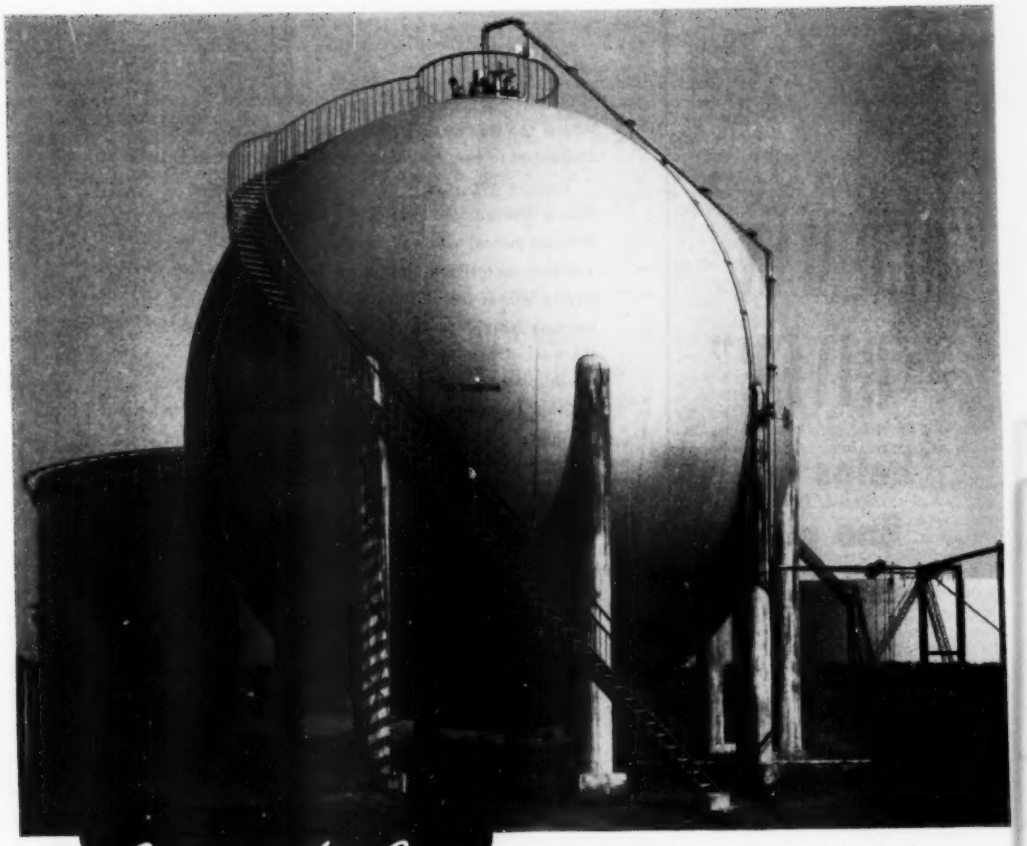
Early operation of the Fawley refinery is particularly important to Britain because of the loss of the now shut-down Abadan refinery of Anglo-Iranian Oil Co., Ltd., in Iran. Fawley was designed originally to charge in large part Iranian crude but now is expected to use other Middle East oil.

## West German Reserves Up

Crude-oil reserves of West Germany are now estimated at 38,025,000 tons, or approximately 270,000,000 bbl.

The latest estimate, prepared by the German Geological Survey in cooperation with the producing companies, shows that total reserves increased by a nominal 1,500,000 tons during the preceding year. Since the country's production during the year was about 1,100,000 tons, new reserves in West Germany actually amounted to 2,600,000 tons.

Of the 38,025,000-ton total, about 27,500,000 tons can be regarded as



# *Cutting the Cost* OF VOLATILE LIQUID STORAGE

In storing butane or similar hydrocarbons, the Hortonsphere proves its operating efficiency by giving more dependable service at a minimum cost. Here is better storage that can put greater profits into your operation.

One important saving is steel. With today's critical material shortages—the Hortonsphere requires less steel per barrel of capacity than any other shaped container.

Also the Hortonsphere reduces maintenance by permitting easy accessability to the entire tank shell. Painting is both quicker and simplified because of the reduced surface area.

Finally, the Hortonsphere gives more years of service because interior corrosion is minimized. That's because of the absence of oxygen inside the tank.

Hortonspheres are built in standard capacities ranging from 1,000 to 25,000 bbls. Information on these pressure containers or other efficient Horton storage units may be obtained by writing our nearest office. Take advantage of this service. There is no obligation on your part.

## CHICAGO BRIDGE & IRON COMPANY

*Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA*

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025-201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3...1615—1700 Walnut Street Bldg.
Salt Lake City, 4.....525 West 17th South St.
San Francisco, 4.....1554—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.
Washington 6, D. C.....1139 Cafritz Bldg.

*REPRESENTATIVES AND LICENSEES*

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo N.V., Amsterdam—O, Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704-C, Rio de Janeiro, Brazil

# "OLD MAN RIVER"

## helps cut line pipe costs

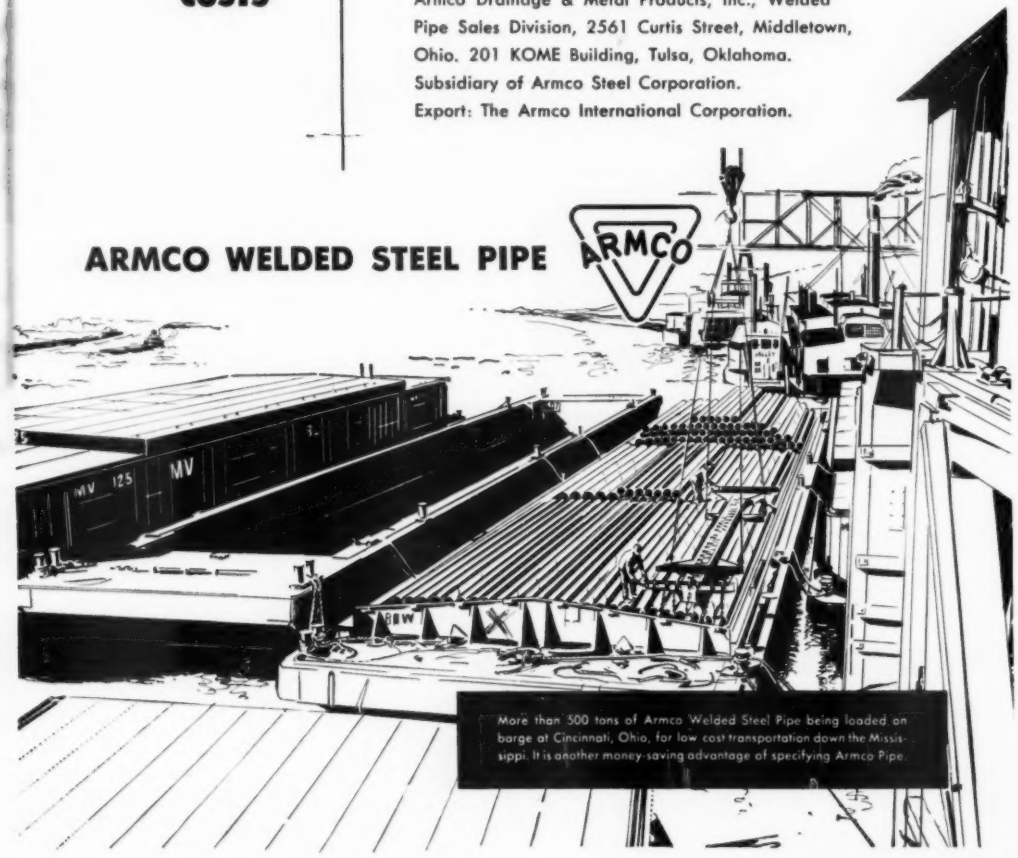
Armco can ship direct by barge down the Ohio and Mississippi to help cut transportation costs on line pipe.

You can also save in many other ways by using Armco Welded Steel Pipe. The wide range of diameters (6 to 36 inches) with wall thicknesses from 9/64- to 1/2-inch means you can match exact needs without buying excess metal. Installation costs are less because lengths up to 50 feet simplify and speed the work. There are fewer sections to handle, fewer joints to assemble.

Other advantages of Armco Steel Pipe include flexibility—slack loops and cold bends are no problem—and a high safety factor against internal and external pressures.

Use Armco Pipe with confidence for oil and gas lines, gathering systems and wherever else you need dependable piping. Write for complete information. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 2561 Curtis Street, Middletown, Ohio. 201 KOME Building, Tulsa, Oklahoma. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

**ARMCO WELDED STEEL PIPE**




More than 500 tons of Armco Welded Steel Pipe being loaded on barge at Cincinnati, Ohio, for low-cost transportation down the Mississippi. It is another money-saving advantage of specifying Armco Pipe.

proved, and 10,500,000 tons as probable. The Emsland area, with 18,900,000 tons proved and about 7,000,000 tons probable, has the greatest reserve. Proved reserves increased more than 2,000,000 tons during the year due to favorable drilling results in Ruehlermoor and Dalum.

The Hanover area showed an increase of 2,000,000 tons to a total of 10,150,000 tons. This was due principally to enlargement of the Eldingen and Suderbruch fields by extension drilling and the discovery of the new field, Hohne. Other areas were Hamburg-Holstein, total reserves, 1,960,000 tons, and Baden, 65,000,000 tons.

## Port Jerome Rebuilding Ends

The recent opening of a new laboratory at the Port Jerome refinery of Standard Francaise des Petroles marked the completion of reconstruction work which has been carried on since the end of the war.

This new laboratory will not only check and control production but also will undertake research work. The Port Jerome refinery, one of the largest in France, was almost completely destroyed during the war.

As now reconstructed and enlarged, it has an annual throughput capacity of approximately 1,928,000 tons (about 40,000 bbl. daily). A new Le Havre-Port Jerome pipe line is in operation and will allow the movement of nearly 4,000,000 tons a year (80,000 bbl. daily) once the second pumping station now under construction is completed. The line transports crude to Port Jerome and the nearby Socony-Vacuum refinery.

## French Line Under Way

Construction work was commenced recently on the 140-mile, 10-in. pipe line being built from Le Havre to Paris, France. Crews are working from Gennevilliers near Paris and from Le Havre. Laying of the line is expected to be finished by October when the crews meet near Grainville.

The line will carry products from three refineries in the Lower Seine Valley to the French capital. The project is a joint undertaking of the French oil companies, the French Government, and the Harbor of Le Havre.

# AFRICA

## Synthesis Plant Started

Work has started on construction of world's first modern gasoline-from-coal plant at Coalbrook in the Union of South Africa.

A report from Johannesburg noting commencement of construction said about 80 per cent of the installation will be supplied from Germany with some of the remaining equipment coming from the United States.

The government-backed undertaking is expected to produce annually about 60,000,000 gal. (4,700 bbl. daily) of motor fuel and diesel oil, plus a wide range of byproducts such as aromatic chemicals, benzene, toluene, and ammonia. M. W. Kellogg Co. has the contract for the plant which will use Kellogg's synthol process.

# LATIN AMERICA

## Gas to Caracas

### Venezuela's first line to be operating in September

VENEZUELA'S first major natural-gas line is expected to go into partial operation in September.

The main section of the line, being built by Venezuelan Atlantic Transmission Corp., is now about four-fifths completed and is expected to be tied in with industrial service lines in the Caracas area early next month.

The system originates in Placer field, in the State of Guarico.

Late in July, Venezuelan Atlantic Refining Co. had completed 36 miles of 10-in., 8-in., and 6-in. gathering lines in Placer field to supply gas for the system. At the other end a spread was laying service lines in the Caracas area. Two Williams Brothers spreads were working on the main line.

From Placer field to Charallave, 70 miles away, the line is 16 in. in diameter. At Charallave the system splits, with a 35-mile, 12¾-in. line running to Caracas and on down to Arrecife and La Guaira. A 90-mile, 10¾-in. line is scheduled to be built north from Charallave through Tejerias, La Victoria, Cagua, and Maracay to Valencia.

Construction was planned to permit utilization of the Caracas leg of the system before completion of the line to Valencia.

Initially the system will operate without compressor stations. Gas will be delivered to the line at a pressure of about 800 psi.

As the line load is increased to serve more and more industries, compressor capacity will be installed to boost the throughput of the line.

Venezuelan Atlantic Transmission Corp. was formed by Atlantic Refining Co. and E. Holley Poe. It will provide for industrial use natural gas formerly flared in the field.

About 15 per cent of Venezuela's gas production heretofore has been used as plant fuel and for repressuring and the other 85 per cent flared. Venezuelan officials for several years have seen great possibilities in industrial development, particularly regarding steel production and other heavy industry, as a result of making available natural gas as a fuel.

## De Mares Reserves Up

Oil reserves of the De Mares concession in Colombia, formerly estimated at about 72,000,000 bbl., are now considered to total around 108,000,000 bbl. as a result of additional drilling in the area. This figure was given recently by Dr. M. Carvajal, Colombian Minister of Fomento, in a radio address in Bogota. He reviewed the over-all oil position of the country and said that the remaining oil in De Mares will be sufficient to meet the needs of the Barrancabermeja refinery for a long time in the future.

The official Colombian Government oil company, Empresa Colombiana de Petroles, which will take over the concession when its 30-year term expires the 25th of this month, has taken all necessary steps to continue the operation, Dr. Carvajal said. He mentioned the contracts which the Empresa has signed with International Petroleum Co., Ltd., under which International will supply technical assistance at cost in the fields and lease the refinery. Tropical Oil Co., an International subsidiary, has held the De Mares concession.

The minister said that conservative estimates on future income from oil operations indicate that the government will receive the equivalent of about $14,000,000 annually, or three times the income which Tropical has been paying in royalties and taxes. He pointed out that International has offered a $10,000,000 loan toward the cost of the refinery modernization.

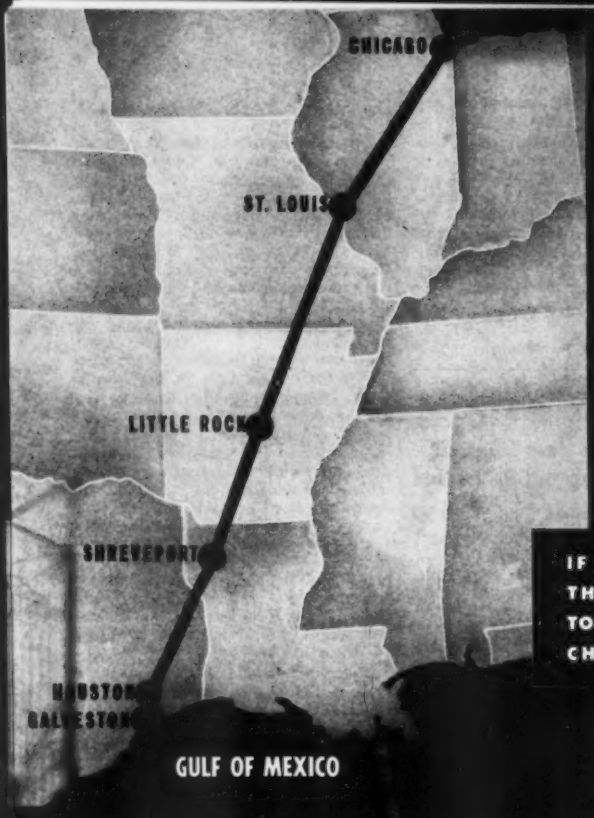
## Argentina's Imports High

Movement of crude oil from Iran to Agentina continued during June when a total of 122,002 tons, or about 850,000 bbl., were lifted from Bandar Mashur.

The shipments were prior to June 22 when exports out of Iran were halted in the nationalization dispute. Argentina's imports of both petroleum and coal during June were at a high level. The imports, in metric tons:

| | June 1951 | May 1951 |
|---|---|---|
| Fuel oil | 253,488 | 171,245 |
| Crude oil | 249,640 | 231,661 |
| Naphtha | 3,940 | 3,879 |
| Total | 507,068 | 406,785 |

The sources for these imports include Aruba, which supplied all the naphtha and 15,203 tons of the fuel oil. Trinidad supplied 33,806 tons of fuel oil, and the remainder came from Curacao. Loading ports for crude oil were: Bandar Mashur, 122,002 tons; Puerto La Cruz (Venezuela), 41,453 tons; Port Arthur, 14,700 tons; Lobitos (Peru), 14,813 tons; Beaumont, 16,306 tons; Ras Tanura (Saudi Arabia), 13,200 tons; Amuay (Venezuela), 15,000 tons; and Miri (British North Borneo), 11,015 tons.




# Schlumberger

## offers you

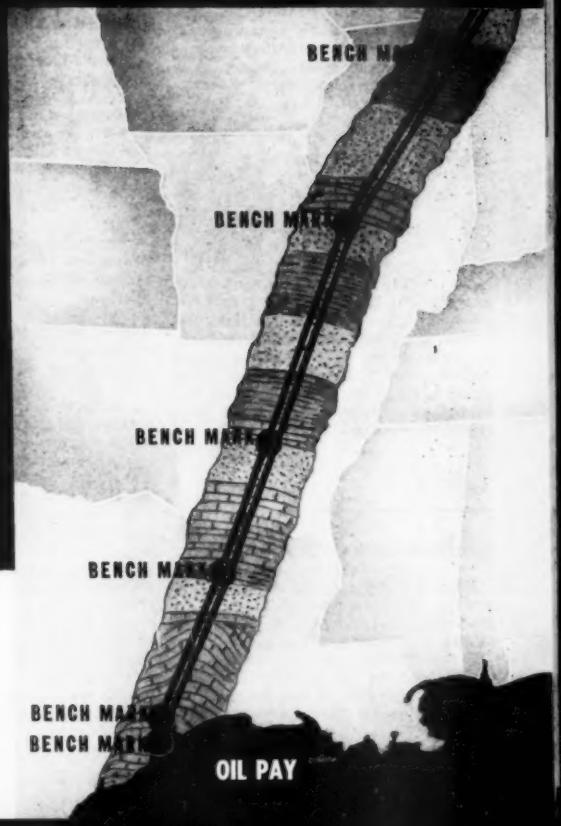
## POSITIVE DEPTH CONTROL

## on your

## PERFORATING OPERATIONS

**IF YOU WERE ASKED TO GIVE THE DISTANCE FROM HOUSTON TO GALVESTON, WOULD YOU BRING CHICAGO INTO THE PICTURE?**

Then why depend on derrick floor measurements to perforate your oil well? Use Schlumberger Electrical Logs, Gamma Ray Logs, and Casing Collar Logs to obtain positive depth control for well completions by establishing natural bench markers in the hole. Ask your Schlumberger Engineer for details of how you can take maximum advantage of these dependable Schlumberger services.




SCHLUMBERGER

SCHLUMBERGER WELL SURVEYING CORP.

HOUSTON, TEXAS

# PERSONALS

## Production Head

### Swearingen named to top post of Indiana Standard

J. E. SWEARINGEN has been appointed general manager of production of Standard Oil Co. (Ind.) at Chicago. He has been a director and assistant to the executive vice president of Stanolind Oil & Gas Co. at Tulsa.

He joined Standard in 1939 as a chemical engineer in the research department at Whiting, Ind. After holding several positions in Standard's research department, he was transferred to the manufacturing department of Stanolind in 1947.

He was named assistant to the vice president in charge of operations in 1949 and, subsequently, became manager of Stanolind's central division with headquarters at Oklahoma City. Early this year he was transferred to Stanolind's general office in Tulsa as executive assistant to the executive vice president. In May he was elected a director of Stanolind.

Swearingen was graduated from University of South Carolina with a B.S. degree in chemical engineering and received his M.S. degree from Carnegie Institute of technology.

A native of Columbia, S. C., he is a member of the American Petroleum Institute, American Institute of Mining and Metallurgical Engineers, and several other professional organizations.

**A. W. Hughes,** geologist for Union Oil Co. of California, Los Angeles, will retire from the company Septemper 1 to set up offices as a consultant. He will become associated with **Dr. P. P. Goudkoff** with offices in Los Angeles.

**Darrel L. Kirkpatrick,** formerly district geologist for Chanslor-Canfield Midway Oil Co. in the San Joaquin Valley, California, has resigned to open a consulting office in Bakersfield, Calif.

**Billy B. Kennedy,** former student at Texas A. & M. College, has joined Ohio Oil Co. at Bridgeport, Ill., as junior petroleum engineer.

**G. Murray Gillespie,** consulting petroleum geologist, has moved his offices from Albion, Ill., to Mount Carmel, Ill.

**Edwin H. Barsachs,** former student at Missouri School of Mines, has joined Atlantic Refining Co. at Dallas as junior engineer.

**O. L. Martin,** formerly general superintendent of field operations for Roosevelt Oil & Refining Corp. at Mount Pleasant, Mich., has joined McClure Oil Co. and Commonwealth Pipeline Co. at Alma, Mich., as supervisor of all production and pipe-line field operations.

**F. David Hart,** recent chemical engineer graduate of Lafayette College, has joined General Petroleum Co. at Los Angeles as a technician in the production laboratory.

**G. W. Walker,** petroleum engineer for Magnolia Petroleum Co., has been transferred from Snyder to Falfurrias, Tex.

**G. D. Craighead,** tool pusher for Penrod Drilling Co., has been transferred from Houma, La., to Ruston, La.

**Kelly M. Brownlow,** formerly of Texas A. & M. College, has joined Sun Oil Co. at Bay City, Tex., as engineer trainee.

**Hugh R. Lamberth,** formerly with Refinery Maintenance Co. at Tulsa, has joined the Petroleum Administration for Defense at Washington, D. C., as chief of the gas-materials branch.

**R. G. Greene** has been appointed exploration manager of Union Oil Co. of California's expanding western area, embracing the Pacific Coast, Rocky Mountain and Canadian divisions. He will be responsible for all land acquisitions there. **John R. Sloat** succeeds Greene as manager of exploration of the Pacific Coast division. Greene, who first joined Union in 1929, was in charge of natural-resources investigations for Union Pacific Railroad from 1937-1943. He rejoined Union in 1943, and was named manager of exploration of the Pacific Coast division in 1949. Sloat joined the firm in 1938, was appointed geophysical supervisor in 1940, and when Union purchased United Geophysical Co. in 1950, became coordinator of geophysical and geological data in the Pacific Coast division.

**H. W. Prentis, Jr.,** chairman of the board of directors of Armstrong Cork Co., has been elected to the board of directors of Atlantic Refining Co. to fill the vacancy caused by the recent death of A. A. Garrabrant.

**Marion L. Fort** has been named vice president and general manager of Pacific Lighting Gas Supply Co., Los Angeles. With the firm since 1923, he formerly was vice president and general superintendent. **R. W. Todd** was advanced to a vice presidency, retaining his title of chief engineer. R. C. Loomis was made superintendent of operations for the company.

*M. O. JOHNSON*

**M. O. Johnson** has been named assistant manager of the supply and transportation department of Phillips Petroleum Co. **J. L. Kyser** succeeds Johnson as coordinator, with **H. J. Horsch** as his assistant. Johnson also has been elected executive vice president of Phillips Pipe Line Co., a wholly owned subsidiary of Phillips Petroleum. In other organizational changes of Phillips Pipe Line, **J. W. Boyd** became vice president in charge of operations of the products pipe-line division, and **W. H. Wallace,** vice president in charge of the crude-oil pipe-line division.

**F. C. Austin** has been transferred from Shell Oil Co.'s Wichita, Kans., division to Tulsa as mechanical engineer. Other Shell changes include: **N. J. Matthews,** transferred from Great Bend, Kans., to Denver and promoted to division reservoir engineer; **D. J. Brammer,** transferred from Great Bend to Denver as exploitation engineer; **R. H. Miller,** production foreman at Great Bend, transferred to Sterling, Colo., as district foreman; **E. L. Shields,** drilling foreman, transferred from Wichita to Denver; **J. D. Duren,** exploitation engineer at Breat Bend, transferred to Denver; **C. M. Chappell,** transferred to Denver from Houston and promoted to subsurface geologist; **R. F. Nelson,** transferred from Centralia, Ill., to Great Bend as district mechanical engineer; **J. E. Saye,** district mechanical engineer at Great Bend, transferred to Elk City, Okla.; **J. E.**

# PERSONALS

**Gray,** transferred from Centralia to Denver as division production manager; and **R. J. Bauer,** transferred from Elk City to Denver as mechanical engineer.

**H. L. Fitts** has opened a geological consulting office in Tulsa.

**George A. Limb,** formerly with Interstate Pipe Line Co. at Wewoka, Okla., has joined Esso-Colombiana, S. A., at El Centro, Colombia, as district superintendent.

**Charles A. Stewart,** geologist for Union Producing Co., has been transferred from San Antonio to Beeville, Tex.

**V. A. Knight,** production superintendent for **Paul F. Barnhart,** independent producer, has been transferred from Snyder to Midland, Tex.

**Kenneth E. Harsh** has been named district manager of Natural Gas Co. of West Virginia, distribution district No. 2. He succeeds **J. A. Harwood,** who has retired.

**C. E. Davis,** vice president of Shell Oil Co., has been appointed deputy director of the refining division of the Petroleum Administration for Defense.

**Joe Parmenter,** formerly with Wilshire Oil Co. in Bakersfield, Calif., has joined D. D. Feldman Oil & Gas Co. as a geological engineer at Los Angeles.

**L. J. Onstott,** former student at Texas A. & M. College, has joined Houston Oil Co. at Refugio, Tex., as engineer trainee.

**Carl J. Hauck,** supervisor of underground storage for Ohio Fuel Gas Co., has been appointed general superintendent of production at Worthington, Ohio. He joined the firm in 1919 as well tender and was promoted to well foreman in 1934 and to district foreman in 1947. From 1947 until 1949 he was acting superintendent of the southern production field.

**R. C. Tucker** has been elected president of two Lubbock oil firms, George P. Livermore, Inc., and Great Western Producers, Inc. He succeeds **George P. Livermore,** who resigned August 7. Tucker, who joined the firms in 1945, was formerly executive vice president. He began his oil carrer in 1919 with Carter Oil Co. He since has served with Trans-Continental Oil Co., American Petroleum Co. of Texas, and Mid-Continent Supply Co. Livermore will continue to participate in the companies as a member of the board.

**Eugene L. Sterrett,** plant engineer for Ohio Oil Co., has been transferred from Sidney, Neb., to Casper, Wyo.

**Robert Bigard,** tool pusher for Parker Drilling Co., has been transferred from Snyder to Midland, Tex., in the same capacity.

**W. S. Payne,** formerly development engineer with Richfield Oil Corp. at Los Angeles, recently resigned to join Zublin Bit Co., Los Angeles.

**Ted A. Rogers,** foreman for Skelly Oil Co., has been transferred from Morton to Aspermont, Tex.

**Joe Stasrey, Jr.,** formerly a student at Louisiana State University, has joined Richardson & Bass at New Orleans as petroleum engineer.

**Robert L. Stover,** district engineer at Oklahoma City for Anderson-Prichard Oil Corp., has been transferred to the West Texas-New Mexico district as foreman.

**J. D. Moody** has been promoted to assistant division geological supervisor responsible for exploration activities of Gulf Oil Corp.'s Fort Worth office. **J. R. Crump,** assistant division geological supervisor, has been made responsible for drilling and development activities. **P. A. Grant,** assistant division geological supervisor, has been placed in charge of activities relative to reservoirs and reserves. **M. E. Upson,** formerly chief paleontologist, has been named division paleontologist.

**William T. Nightingale,** formerly vice president in charge of exploration, production, and transmission of natural gas for Mountain Fuel Supply Co., has been transferred from Rock Springs, Wyo., to Salt Lake City, Utah, and promoted to president. He now acts as manager of producing, pipe line, and distribution operations.

**Emil Kluth,** vice president of Pacific Western Oil Corp., has been elected chairman of the administration group of the Conservation Committee of California Oil Producers. **M. D. Hughes,** chief petroleum engineer for the city of Long Beach, has been elected chairman of the engineering board that will study oil field performance and conservation.

**J. R. Fanshawe,** Rocky Mountain division manager for Seaboard Oil Co. with headquarters at Casper, Wyo., has resigned to become a consulting geologist. **A. W. Vitt,** division chief geologist, has been named acting manager for Seaboard, and **Phill S. Kister** replaces Vitt in the geological position. Fanshawe has been in charge of operations with Seaboard since the firm moved to the Rocky Mountins 4 years ago. He will maintain offices at Casper.

**H. H. Bronsdon,** formerly secretary-treasurer of British American Oil Co., Ltd., has been appointed secretary-treasurer of the newly formed company, Trans-Northern Pipe Line Co., Ltd. Jointly owned by Shell Oil Co. of Canada, Ltd. McColl-Frontenac Oil Co., Ltd., and B-A, Trans-Northern will transport finished petroleum products from Montreal East to Ottawa, Toronto, and Hamilton. Directors elected include: **W. M. V. Ash** and **R. P. Ritchie,** representing Shell; **T. C. Twyman** and **A. G. Farquharson,** representing McColl - Frontenac; and **Robert E. Kepke** and **J. R. Dawson,** representing British American.

**Joe Keahey,** formerly with **H. D. Atha,** has joined the staff of Pursuit Oil Co. at Evansville, Ind.

**Joe D. King,** production superintendent for Pure Oil Co., has been transferred from Clay City, Ill., to West Liberty, Ill.

**Robert H. Angvine,** engineer for Sohio Petroleum Co., has been transferred from Bethany, Okla., to Oklahoma City.

**Leland E. Wilson,** petroleum engineer for Atlantic Refining Co., has been transferred from Corpus Christi, Tex., to DeRidder, La.

**Walter Johnson,** chief geologist for Sohio Petroleum Co. at Houston, has been transferred to Lewistown, Mont., as staff geologist making regional subsurface studies of Montana and North Dakota.

**W. S. Hill,** district petroleum engineer for Union Producing Co., has been transferred from Refugio, Tex., to Houston.

**Floyd D. Sawyer,** former student at the University of Texas, has joined Stanolind Oil & Gas Co. as an engineer trainee.

**W. H. Mitchell,** petroleum engineer for The Texas Co. at Alvin, Tex., has been transferred to Palestine, Tex., as production foreman.

**V. C. Watson,** tool pusher for Penrod Drilling Co., has been transferred from Liberty, Tex., to Haynesville, La., in the same capacity.

**Don Madden,** petroleum engineer trainee with British - American Oil Producing Co., has been transferred from Seymour to Pampa, Tex.

# PERSONALS

**William H. Martin,** formerly general superintendent for Heyser & Heard Oil Co. at Midland, Tex., is now president of The Oil Corp. at Corpus Christi, Tex.

**Harry A. Larsh,** geologist for Shell Oil Co., has been transferred from Houston to Tyler, Tex.

**Fred C. Aldrich,** gas engineer for Ohio Oil Co. at Rawlins, Wyo., has been transferred to Casper, Wyo., where he will assume general production engineering duties.

**Carl Miles,** president of Miami Operating Co., Inc., independent producing firm, has moved his offices from Grayville, Ill., to Abilene, Tex.

**David J. Cozad,** gas production engineer for The Chicago Corp. at Bishop, Tex., has been transferred to McAllen, Tex., as oil and gas production engineer.

**J. Lee Johnson, Jr.,** well-known southwestern oil man, has been elected president of the First National Bank of Fort Worth succeeding **M. A. Fuller,** who has been elected chairman of the board. Johnson has substantial interests in 749 producing wells on the Mallet Lands in the Lubbock, Tex., area and 370 producing wells on the ranch of the Johnson estate in Ector County, Texas.

**J. J. Dorgan, Jr.,** in the coordinating and planning department of Continental Oil Co. at Houston, has been granted leave of absence to join the program division of the Petroleum Administration for Defense at Washington, D. C.

**C. H. Ingram,** gasoline plant superintendent, has joined Mountain Fuel Supply Co. at Rock Springs, Wyo.

**Cecil F. Dillingham,** president of Dillingham Oil Corp., has moved his offices from Healdton, Okla., to Ardmore, Okla.

**Fred S. Nesmith, Jr.,** junior petroleum engineer for Stanolind Oil & Gas Co., has been transferred from Houston to Corpus Christi, Tex.

**Charles W. Lane,** area geologist for southern and western Oklahoma and assistant to the geology manager of Deep Rock Oil Corp., has been appointed technical and administrative assistant to the vice president. **I. S. Higginbotham,** Tulsa area geologist, has been named new assistant to the geology manager. **Harry M. Cooper, Jr.,** graduate of Ohio State University and Carnegie Tech, has joined the firm as assistant geophysical manager under **C. J. Harvey. Robert D. Gensch,** former Tulsa area geologist, has moved to Wichita, Kans., as area geologist to reopen the firm's offices there. **Kenneth Holke,** recently with Cooperative Refinery Association, joins the new office as assistant geologist. In the Rocky Mountain area, the Sterling, Colo., office is being closed and a new one opened at Casper, Wyo. Former Sterling geologist, **R. J. Field,** and scout, **R. G. Boekel,** are being moved to Denver, while **M. R. Reston,** scout, has been transferred to Casper. All Oklahoma operating activities of the division are now consolidated in an Oklahoma City office under the supervisions of **O. E. Gram,** area geologist, and **L. L. Crozier,** area landman. **Charles D. Moore,** formerly with Stanolind Oil & Gas Co., has been added to the Oklahoma City staff as geologist.

**M. W. Marshall,** formerly petroleum engineer for **R. V. Fitting, Jr.,** at Midland, Tex., has joined the Texas Railroad Commission at San Angelo, Tex., as district petroleum engineer.

**Jack Francis Dougherty** has been elected vice president of Empire Trusts Co.'s oil and natural-gas department. He was previously vice president of DeGolyer & MacNaughton, Dallas, acting as senior geologist and petroleum and natural-gas engineer. From 1942 to 1945 he was associated with Phillips Petroleum Co. at Amarillo, Tex.

# DEATHS

**Walace Hawkins,** 54, vice president of Magnolia Petroleum Co. and the firm's chief legal counsel, was shot to death at his home in Dallas August 5. His 16-year-old son Michael confessed the shooting. Hawkins received the Texas Mid-Continent Oil and Gas Association's service award in 1947. He was a member of the executive committee of both the Texas Mid-Continent and the general Mid-Continent Oil and Gas Association.

**Dr. Horace C. Feagin,** chief surgeon for United Gas Corp. for the past 20 years, died July 29 at Houston.

**Paul J. Clarkson,** 54, retired oil man, died in San Antonio August 1. He was president of Maryland Corp., and vice president of Producers Corp. of Nevada.

**Harvey Howard Lee,** 57, driller of the George Strake discovery well that opened Conroe field, died July 30, at Conroe, Tex.

**Raymond W. Jackson,** 51, who had been employed by Humble Oil & Refining Co. for 29 years, died July 28 at LaPorte, Tex.

**John Andres Smith,** 67, retired gasoline-plant foreman for Danciger Oil & Refining Co. at Pampa, Tex., died in Tulsa July 31.

**John W. McCoy,** retired drilling contractor, died in Los Angeles July 29.

**E. Russell Lloyd, Jr.,** 26, consulting geologist, died in Midland, Tex., July 31.

**Dr. Martin Andre Rosanoff,** 76, distinguished chemist and former dean of the Duquesne University Graduate School, died in Pittsburgh July 30. Dr. Rosanoff's scientific research in the fields of fractional distillation, sugar hydrolysis, and thermodynamics won him international recognition.

**Alfred G. York,** director and vice president of Watson-Stillman Co., died at Elizabeth, N. J., July 22.

**Edson Collins Oak,** 65, formerly with the old Echo Oil Co. and later connected with drilling operations at Chanute, Kans., died there August 3.

**John Merritt,** 92, oil pioneer, died at Parkville, Mo., August 1.

**J. N. Wofford,** 50, special representative for the southern division of Parkersburg Rig & Reel Co., died at Houston July 28.

**Frank S. Hibner,** 63, chief accountant of the auditing section of Phillips Petroleum Co., died in New York City July 31. He had been with the firm for 22 years.

**T. J. Hudson,** 40, owner of Hudson Oil Co., which has service stations in 17 states, died August 4 at Houston.

**Travis L. Golay,** 66, of General American Oil Co., died in Dallas August 4.

**George Edgar Renfro,** 52, head of the mechanical department of the El Segundo refinery at Standard Oil Co. of California, died at El Segundo July 31.

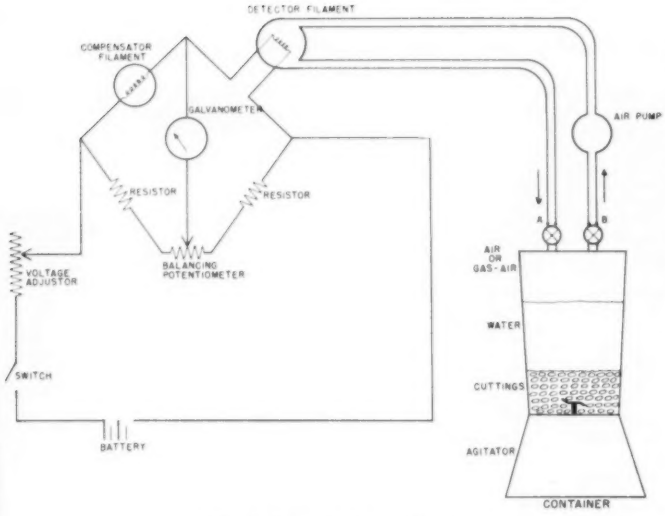



*Fig. 1—Diagram of gas detector.*

# *Application and interpretation of*

# *Hydrocarbon Well Logging*

**Method has been used successfully in the western United States, Canada, Mexico, and South America. Several hundred new pay sections have been logged.**

**by Jack E. Bliss**

HYDROCARBON well logging is a method of continuously analyzing the drilling mud and drilled cuttings at the well site for gas and oil content. If any gas or oil is present in the formation being drilled, the gas or oil will be detected as soon as the mud and cuttings have been circulated to the surface and tested.

### Application of Hydrocarbon Well Logging

Hydrocarbon well logging has been generally accepted as a necessity in the last few years when drilling exploratory wells. There are three principal advantages to using hydrocarbon well logging when drilling wildcats. They are as follows:

1. Every gas or oil-bearing section will be detected as it is drilled. No potential pay will be passed up.

2. Coring programs can be coordinated so that cores can be taken in the favorable horizons. Coring zones that do not contain gas or oil is minimized.

3. Drill-stem tests can be made immediately on zones that are gas or oil bearing and appear to be worth testing; this is of particular importance because some formations become watered or mudded off very quickly and provide misleading information when testing is delayed. Drill-stem testing of sections that contain no gas or oil shows in the formation can be eliminated.

In many brown limestones and reef limestones containing crude oil, and sand or limestone formations containing high-gravity oil, little or no visible stain can be detected by microscopic examination. Gas shows usually go undetected when hydrocarbon well logging is not used.

### Description of Hydrocarbon Well Logging

Hydrocarbon well logging is a 24-hour-a-day service at the well site, employing experienced personnel using specially developed equipment. Generally every 2 ft. of formation drilled is timed for drilling rate, and timed for lag up the hole. When the mud and cuttings reach the surface the well-logging operator analyzes them for gas and oil content. The cuttings are trapped in a settling trough so that no small cuttings or unconsolidated sand will go undetected.

In the detection of gas from drilling mud, usually a small stream of the mud is diverted from the flow line and subjected to agitation in a closed trap. A small air pump sucks the air or gas-air mixture from the top of the trap to a gas detector in the logging unit. If any gas is present it will be indicated on the gas detector. Another method is to sample every 2 ft. of lag-corrected mud, place it in a closed quart container, and mechanically agitate it. Any released gas is circulated across the gas detector.

In the detection of gas from the cuttings, about ¼ qt. of samples from each 2 ft. of lag-corrected cuttings is placed in a closed quart container which is about half full of water. This mixture is mechanically agitated to break up the cuttings and release any gas which might be present in the cuttings. This air or gas-air mixture which exists above the cuttings-water level is circulated across the gas detector. If any gas is present it will be detected.

**Gas detection.**—The gas detector, which is a special type of Wheatstone bridge, is shown in Fig. 1. With hoses A and B removed the detector is balanced with the balancing potentiometer so the galvanometer indicates zero when only air is circulated across the detector filament. The cuttings are then broken by mechanical agitation. Any gas present in the cuttings will be released and will mix with the air in the top portion of the container. Next, the hoses A and B are attached to the petcocks on the top of the container, the petcocks

### THE AUTHOR

**Jack E. Bliss has had long experience in hydrocarbon well logging, beginning in this kind of work in 1939. In 1944, with two other men he founded Rotary Engineering Co. in Midland, Tex., an organization devoted, with affiliated companies, to the performance of continuous hydrocarbon analysis of mud and cuttings, and to core analysis. Branches of this company are now located in Mexico and Canada. Bliss is a native of Greeley, Colo., and graduated in 1933 with a bachelor of science degree in electrical engineering from Colorado University. In the 6 years following his graduation he was engaged in seismograph work with Amerada Petroleum Corp.**

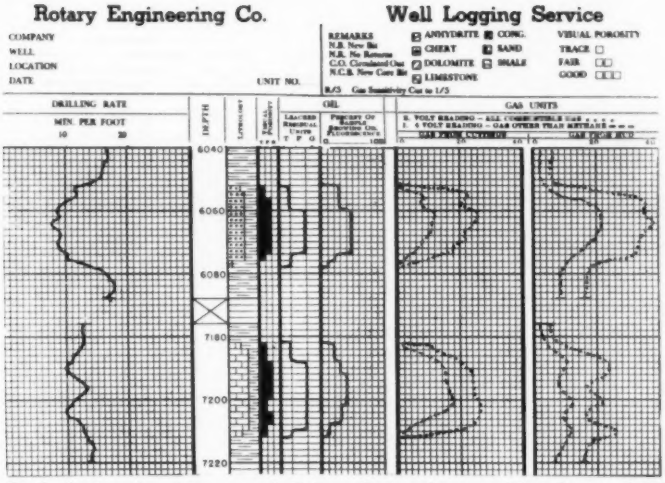



*Fig. 2—Specimen log of two gas and oil shows. Under ordinary conditions these sand and limestone sections which are oil and gas bearing should be tested. A change in lithology, an increase in visual porosity, and a gas and oil showing justify testing these sections. Increased drilling rate is noted through the sand section.*

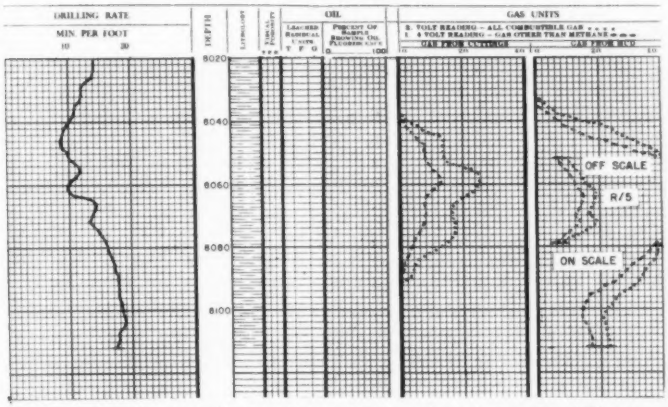



*Fig. 3—Specimen log of gas-bearing shale and tight sandy shale formation. Little change in lithology and no visual porosity are indicated. Under these conditions, section probably not worth testing.*

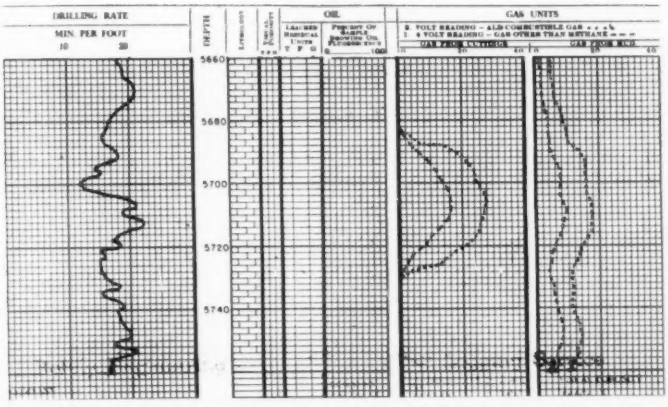



*Fig. 4—Specimen log of a tight limestone section with a gas show but no change in lithology or visual porosity. Under ordinary conditions this section not worth testing. If oil show is present with gas show, one test possibly justified.*

are opened, and the air or gas-air mixture is circulated across the detector filament. If only air is present the bridge will stay in balance; that is, the galvanometer will still indicate a zero reading. When gas is present, a portion of the gas-air mixture comes in contact with the hot detector filament wire and combustion occurs. This burning effect raises the detector filament temperature and thus increases the electrical resistivity, which in turn unbalances the bridge system and causes an indicated reading on the galvanometer. The greater the gas content in the mud or cuttings, the greater will be the galvanometer reading.

After obtaining a gas reading at normal high voltage, at which all combustible gases will burn, the voltage is reduced to a predetermined value where all combustible gases except methane will burn. In this way, by plotting both gas curves an indication of the methane content is obtained. As small as 1 part of gas in 2,500 parts of air can be detected. This may seem to be more sensitivity than is necessary, but in certain instances sensitivity of that range is essential.

When the gas curve exceeds the off-scale reading on the log, it is then plotted on scale at one fifth of its original sensitivity and the curve is labeled R/5.

The gas detector is checked daily for correct performance by circulating small standard amounts of methane through the system. If the detector filament has become somewhat coated by hydrogen sulfide or any other gas, such a condition will be detected by a below-normal standard reading. In this case the coating is burned off by raising the filament voltage to an extremely high value.

**Oil saturation.**—Oil content of the cuttings is detected by placing a representative portion of each lag-corrected 2-ft. sample in a small dish and examining for oil fluorescence under an ultraviolet lamp. This ultraviolet lamp is a specially designed lamp which emits a maximum wave length of 3,650 Angstrom units. Any cuttings that fluoresce or are otherwise suspected of being oil bearing are placed in a thumbhole depression of a color reaction plate and a solvent such as carbon tetrachloride is applied. If oil is present in the cuttings, the operator can see the solvent become cloudy or milky as the oil is extracted by the solvent. This process eliminates the possibility of confusing oil fluorescence with mineral fluorescence. Although rig oil and greases will give a fluorescent cut, by close examination with individual cuttings both under the ultraviolet light and microscope, there is little chance of mistaking rig oil or greases for crude oil in the cuttings.

**Other tests.**—A record of the drilling rate is maintained and plotted. A record of the drilling-mud characteristics is kept. Each 2 ft. of formation sample is examined under the

microscope for lithology and any visible porosity. These are plotted on the log. The lithology is recorded as actual estimated percentages as viewed; that is, even though the operator believes the formation to be a solid sand section, if 20 per cent of the sample is shale, it will be plotted as 80 per cent sand and 20 per cent shale.

At the beginning of the well-logging assignment, the crew chief contacts with the operator's representative concerning the program to be followed; whether drilling breaks are to be circulated out before drilling deeper, or giving notice when gas or oil shows are encountered. Any program set up by the operator is carefully followed.

### Interpretation of Results

Although the gas detector and the ultraviolet lamp indicate the relative amount of gas and oil in the mud or cuttings at the time the mud or cuttings reach the top of the hole, the magnitude of these shows when considered alone does not necessarily indicate whether the section will or will not produce gas or oil when tested. Many factors such as permeability, type of porosity, and bottom-hole pressure help account for the ability of the formation to produce. These same factors have some effect on the magnitude of the gas and oil shows. The gas detector and ultraviolet lamp will indicate gas and oil in any formation where gas or oil is present, but they will not necessarily differentiate as to which sections will be commercially productive and which will not.

Fig. 2 is a specimen log of two gas and oil shows that would give the operator almost every reason to recommend a drill-stem test. There is a change in lithology, visual porosity, oil shows in the cuttings, and gas shows in both the cuttings and mud. Some drilling break is also indicated.

Figs. 3 and 4 are specimen logs where gas shows are present; however, since neither visual porosity nor a change in lithology is indicated, these zones are probably not worth testing.

In many cases, very porous sands, such as some Gulf Coast sands, or very vugular or fractured porous limestones, such as Devonian or Ellenburger formations, which may produce gas or oil, give up rather small shows on the hydrocarbon log. Cuttings with very high porosity and permeability when going through the production cycle from bottom-hole pressure to atmospheric pressure will lose a large portion of the original in-place gas and oil. Only the residual gas and oil is retained. Also, in some of these cases the flushing action of the mud, or mud filtrate, ahead of the bit in very permeable formations causes the gas shows in both the cuttings and mud to be small. Tight sands such as the Spraberry, or intercrystalline limestones of low permea-

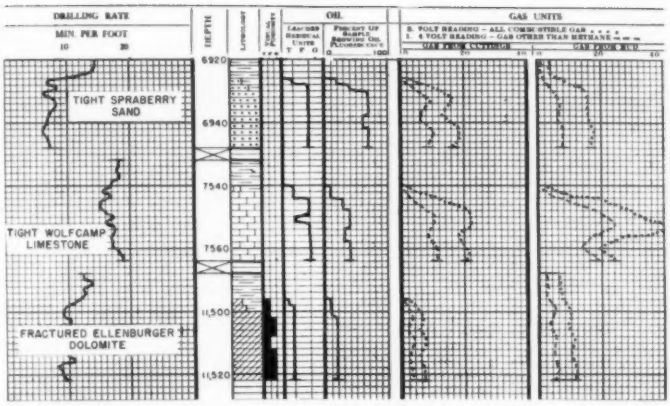



*Fig. 5—Small gas and oil show in fractured Ellenburger would probably be better place to test than similar or even slightly larger gas or oil shows in tight Spraberry sand or tight Wolfcamp limestone.*

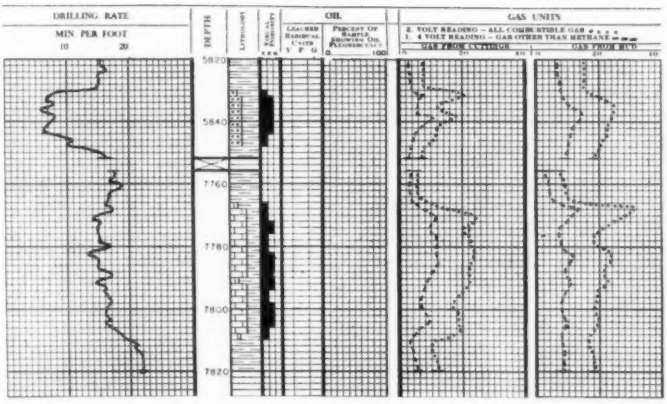



*Fig. 6—Although these gas shows are small they are probably worth testing because a change in lithology occurs, a change in visual porosity is indicated, and there is a small increase in gas readings. If oil cut present, test would certainly be justified.*

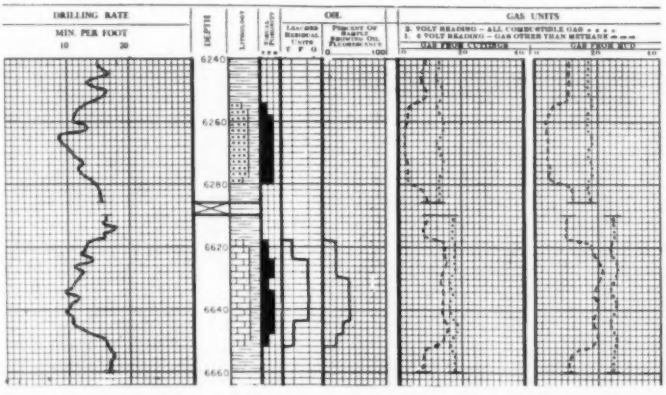



*Fig. 7—Total combustible (high voltage) gas curves in this specimen log changed little in magnitude, but change in ratio of low to high-voltage curves indicates qualitative change in the gas. Such changes in either the "gas from cuttings" or "gas from mud" or both should be considered as true gas show when considering all factors in deciding whether to test.*

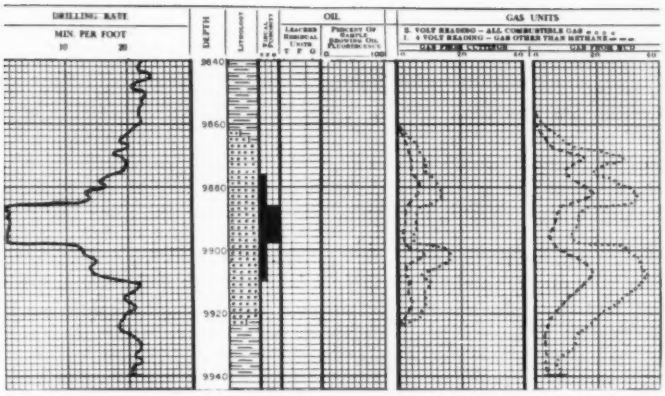



*Fig. 8—Sometimes in extremely permeable gas-bearing sands, due to flushing action of mud or mud filtrate ahead of the bit, gas curves actually decrease slightly through best part of sand. If sand is also oil bearing, a slight effect of this type is sometimes noticed in the oil-cut (leached) curve.*

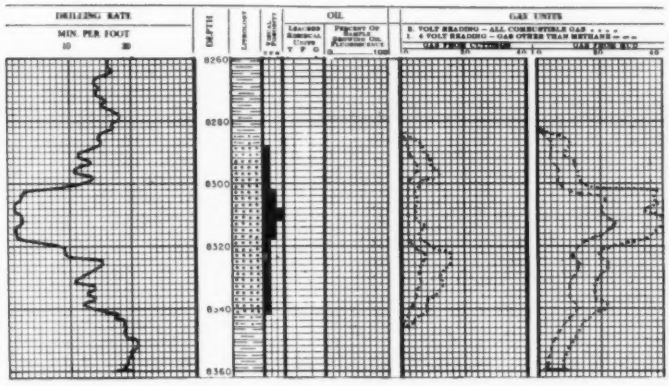



*Fig. 9—Specimen log of porous gas-bearing sand section where permeability is good but not extreme, and sand arrives at surface in unconsolidated grains. Often the "gas from cuttings" curve decreases through best part of section but noticeable increase in "gas from mud" curve will occur. Drilling rate tends to verify porosity; normally this type section should be tested.*

bility such as the Wolfcamp, when gas or oil bearing, generally hold the gas and oil shows very well in the trip to the top of the hole and may give large shows on the hydrocarbon log. (See Fig. 5.) It is self-evident that much more importance be attached to small gas and oil shows from very porous (or unconsolidated) sand or vugular or fractured limestones than should be attached to a small show from a tight sand or limestone formation. Certainly small shows are not necessarily better zones to test than large shows, but the above-mentioned conditions should be considered in evaluating the worth of a gas or oil show as should other conditions mentioned below.

One of the best ways to use the hydrocarbon log is to examine the log for any changes in lithology, or visual porosity, or both. Then a close examination should be made of the gas curves and oil curves. If a change in lithology is indicated, any small change in gas may be significant, particularly if the formations appear to be porous (Fig. 6). Also under these conditions a change in the ratio of low-voltage gas to high-voltage gas curves may be significant (Fig. 7). Changes in the drilling rate should be considered. **In evaluating the worth of a gas or oil show all known allied factors should be considered.**

In rare cases when a gas-bearing sand becomes more and more porous with depth until an extremely porous unconsolidated sand is penetrated, the gas curves may actually decrease somewhat through the most permeable section such as shown in Fig. 8. This happens only occasionaly when the sand has extreme permeability and the flushing action ahead of the bit is tremendous.

Sometimes a gas-bearing sand with good but not extreme permeability is encountered, and the sand arrives at the surface as unconsolidated sand grains. In this case little or no gas may be indicated from the cuttings but a noticeable gas increase will be indicated in the "gas from mud" curve. (Fig. 9.)

Frequently, some gas is recirculated around the mud system causing a continuous "gas from mud" reading. In these cases the gas-from-mud curve is observed carefully for changes in magnitude. If the mud stream becomes excessively gas cut, the gas-from-mud curve may become rather useless as long as that condition exists. The recirculated gas has very little effect on the gas-from-cuttings curve when the cuttings are handled properly.

Some indication of the gravity of the oil can be judged by the color of the fluorescent cut. Usually a very low-gravity oil cuts a fluorescent brown. As the gravity increases there is a gold cut. A further increase in gravity gives a cream-color cut. The high-gravity oils tend to fluoresce blue. Distillates and condensates usually fluoresce light blue or even a hazy blue color.

Any cuttings suspected of being oil bearing, even though they show little or no fluorescence before a solvent is applied, are cut with a solvent under the ultraviolet lamp. This is done for the following reasons: (1) To eliminate the possibility of mistaking oil fluorescence for mineral fluorescence, (2) to obtain a fluorescent value on extremely low gravity oils that do not fluoresce until cut, and (3) to detect the presence of very high-gravity distillates or condensates which indicate little or no fluorescence before being cut with a solvent. In many cases very high-gravity condensates can not be detected under the ultraviolet light after the sample has dried prior to ultraviolet examination.

The gas detector can be used to some advantage when some noncombustible gases are encountered. A sizable show of carbon dioxide will cause the gas-detector galvanometer to kick in reverse to normal. A sizable show of nitrogen will cause the gas-detector galvanometer to give a small positive reading which will not burn out of the filament chamber when circulation of the gas-air stream is suspended, as would a small amount of combustible gas. This small positive reading is due to the fact that nitrogen has a different thermal conductivity than the air to which the detector was originally balanced.

Hydrocarbon well logging has been used with considerable success in all of western United States, Canada, Mexico, and South America. Several hundred new pay sections have been logged by this method.

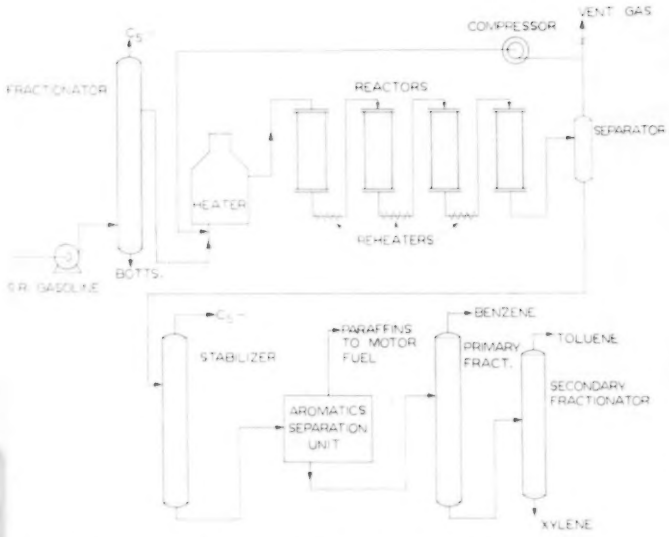



*Fig. 1—Platforming unit for production of benzene, toluene, and xylene.*

# Aromatics Production by the Platforming Process

**by Vladimir Haensel***

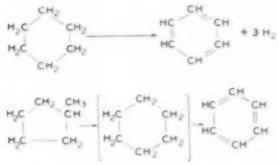
**Production of 200,000 million gallons of benzene per year from petroleum is a distinct possibility based on the diversion of only 0.5 per cent of total straightrun plus natural-gasoline production**

THE national emergency has resulted in a greatly increased demand for the lower aromatic hydrocarbons which were in short supply even before the emergency. These include benzene, used principally in the production of synthetic rubber, plastics, and a variety of essential chemicals, toluene for aviation gasoline and explosives, and $C_8$ aromatics, which are utilized in gasoline and in the paint and chemical industries. The most critical material is undoubtedly benzene with indications[1] that during the next 4 years the benzene requirement will increase from the current 252,000,000 gal. to 411,000,000 gal. in 1955.

### Benzene

The shortage of benzene for 1951 is estimated to be about 10 per cent of the total supply, which amounts to roughly 225,000,000 gal. for this year. The shortages for the following years would, of course, be very much greater if the present production were not increased.

**Benzene from petroleum.**—The availability of large quantities of hydrocarbons from the petroleum industry makes it a logical source of raw materials for the production of benzene and higher aromatics. Let us first look at the actual figures of the availability of the hydrocarbons which can be converted to benzene. Cyclohexane and methylcyclopentane are convertible to benzene as shown below:



The occurrence of these compounds in straightrun gasolines varies depending upon the location of the fields and some representative figures are given in Table 1.

These data indicate that the total naphthene content, that is methylcyclopentane and cyclohexane, amounts to anywhere from 20 to 55 per cent which is increased to a somewhat higher figure by the presence of the natural benzene in the different stocks. This amount is from 1 to 9 per cent based on the 140°-185° F. fraction.

**Aromatics manufacture.**—The next question is "How can this particular material be converted into benzene?" Over the last 2 years, we have discussed the production of high-octane motor fuel by the U.O.P. Platforming process. This process involves the continuous reforming of straightrun and cracked gasolines in the presence of a supported platinum catalyst and utilizing a hydrogen recycle. One of the major reactions in Platforming is the formation of aromatic hydrocarbons. Thus, a plant which operates for the production of motor fuel can operate equally well for aromatic production. Some plants are being designed to operate intermittently for the production of aromatics and motor fuel. Others are being designed for aromatic production and still others for motor-fuel production.

In any case, the conversion from motor-fuel operation to aromatic production is readily accomplished and has been carried out on a commercial scale. Fig. 1 shows the design of a plant for the production of benzene, toluene, and xylene. The plant consists of a feed-preparation column, reactors, and product-separation equipment. Since the formation of aromatic hydrocarbons requires heat input, a number of reactors are used in conjunction with intermediate reheating. The recovery system involves the removal of light hydrocarbons, separation of aromatics, and

**TABLE 1—COMPOSITION OF 140°-185° F. FRACTIONS FROM VARIOUS STRAIGHTRUN GASOLINES (from Reference 2)**

| Hydrocarbon, Vol. per cent | Ponca Okla. | East Texas | Bradford Pa. | Greendale Mich. | Winkler Texas | Midway Calif. | Conroe Tex. |
|---|---|---|---|---|---|---|---|
| Paraffins | 60 | 62 | 78 | 77 | 78 | 44 | 39 |
| Methylcyclopentane | 20 | 23 | 9 | 9 | 15 | 34 | 21 |
| Cyclohexane | 16 | 12 | 12 | 11 | 6 | 21 | 31 |
| Benzene | 4 | 1 | 1 | 3 | 1 | 1 | 9 |
| Total naphthenes | 36 | 35 | 21 | 20 | 21 | 55 | 52 |
| Percent of 140°-185° F. fraction based on $C_5$-360° F. gasoline | 13 | 16 | 15 | 18 | 10 | 12 | 14 |

*Universal Oil Products Co., Riverside, Ill. Presented before Chemical Engineers Club, A.I.Ch.E., at Washington, D. C.

# pumps 21 wells in Wellsville

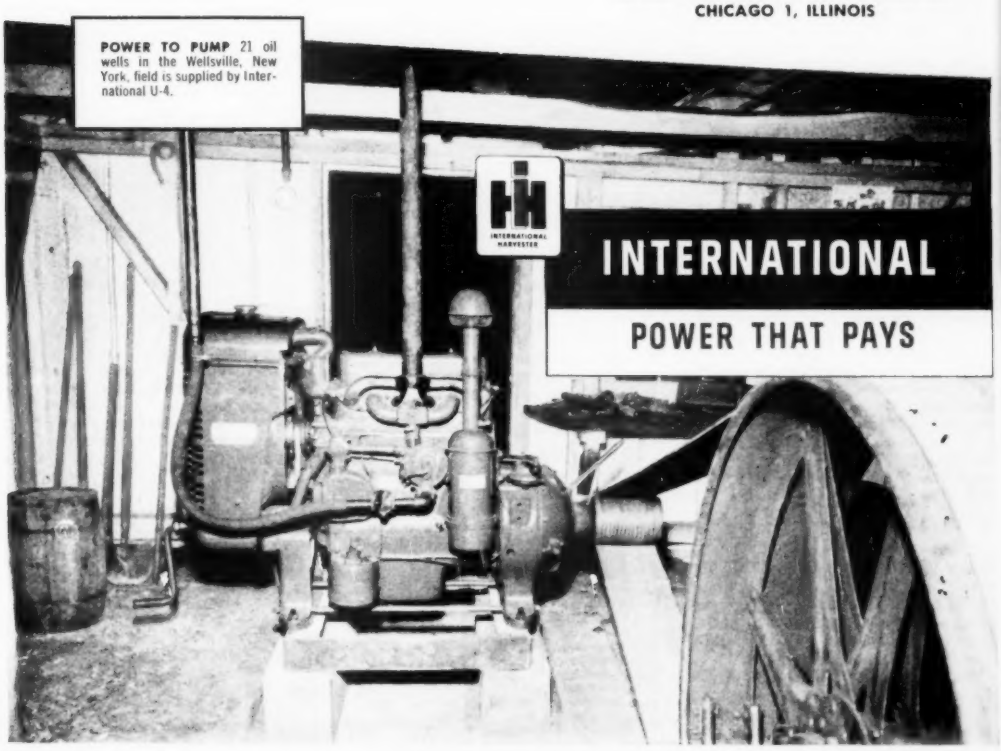
## Rugged little International U-4's replace "One Lungers" in Vulcan Oil Company's modernization program

Jerky "one lungers" are out, and smooth-running, multi-cylinder International U-4 pumping engines are in as Vulcan Oil Company, Wellsville, New York, starts a modernization program.

Fred Walchli, Vulcan's owner, says: "Our first U-4 is set up to pump 21 wells. It's a big improvement over the old 'one lunger' that had to be started by pulling the big wheel. We plan to modernize more of our leases with U-4's now that we have seen how No. 1 performs on this job."

For all the facts on how International power helps modernize your leases, see your International Industrial Distributor, Power Unit Dealer or Oil Field Supply House. See how close you are to complete service facilities, expert servicemen and a complete stock of genuine IH parts. Get your "allowable" at lower cost with International power.

**INTERNATIONAL HARVESTER COMPANY**
**CHICAGO 1, ILLINOIS**




**POWER TO PUMP** 21 oil wells in the Wellsville, New York, field is supplied by International U-4.

redistillation of the extract into benzene, toluene, and xylenes.

**Naphthenes to benzene.**—The conversion of the $C_6$ naphthenes into benzene proceeds very smoothly over the Platforming catalyst as is indicated in Table 2.

**TABLE 2—PROCESSING OF 150°-190° F. CUT FROM A WEST COAST STOCK OVER THE PLATFORMING CATALYST**

| Charging stock | Wt. % | Potential wt. % benzene yield |
|---|---|---|
| Hexanes | 27.7 | |
| Methylcyclopentane | 36.6 | 44.4 |
| Cyclohexane | 11.3 | |
| Benzene | 3.6 | 3.6 |
| $C_7$ naphthenes and paraffins | 20.8 | |
| | 100.0 | 48.0 |

| Product composition, weight per cent of charge | Increasing severity of operation I | II | III | IV | V |
|---|---|---|---|---|---|
| Gas: $H_2$ | 3.0 | 3.0 | 3.0 | 3.1 | 3.1 |
| $CH_4$ | 0.3 | 0.2 | 0.4 | 0.3 | 0.5 |
| $C_2H_6$ | 0.5 | 0.6 | 0.9 | 0.8 | 1.1 |
| $C_3H_8$ | 0.7 | 0.8 | 1.2 | 1.0 | 1.3 |
| $C_4H_{10}$ | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| $C_5H_{12}$ | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| Liquid product: | 95.2 | 94.9 | 94.0 | 94.1 | 93.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Benzene, weight per cent of charge | 36 | 38 | 39 | 41 | 44 |
| Toluene, weight per cent of charge | 12 | 12 | 13 | 13 | 15 |
| Benzene, per cent yield of theoretical | 175 | 79 | 81 | 85 | 92 |

It will be observed that the potential benzene yield from this particular charge stock amounts to 48 per cent by weight of the charge, and by product analyses we find that by changing the severity of operation the benzene yield weight per cent of the theoretical will vary from 75 to 92, depending upon the severity of operation. Thus it will be seen that a stock containing both methylcyclopentane and cyclohexane, and in this particular case, a ratio of methylcyclopentane to cyclohexane of about 3 : 1, is converted in excellent yield to benzene.

**Potential benzene production.**—The over-all yield that could be obtained from straightrun gasoline can now be estimated. Using the published 1949 figures for straightrun-gasoline and natural-gasoline production an estimate has been made of the total potential benzene yield. These calculations include the corrections for the shrinkage incurred during the conversion of naphthenes to the aromatics as well as for the loss of 6 hydrogen atoms during the reaction, and corrections for conversion efficiency.

In addition the estimate includes the natural benzene occurring in the straightrun and the natural benzene occurring in the natural gasoline. The over-all yield amounts to between 600 and 800 million gallons of potential benzene per year. These figures do not include the benzene yield that could be realized from thermally cracked and catalytically cracked gasolines, which contain a certain amount of naphthenic hydrocarbons convertible to benzene.

The above average value of 700,000,000 gal. of benzene is a tremendous amount and it is not out of the question to consider the possibility of producing something of the order of 200,000,000 gal. of benzene per year from petroleum in the not too distant future. On the basis of 200,000,000 gal. of benzene a year the diverted amount based on total gasoline production would amount to about 0.5 per cent of our gasoline production. It should be noted that in converting the naphthenic hydrocarbons to benzene by Platforming, the value of the residual material, which is processed along with the naphthenes, is enhanced. In the normal operation the aromatic-free residue is blended into motor fuel. It has been found that during the formation of benzene the paraffinic constituents undergo isomerization as will be observed in Table 3.

**TABLE 3—COMPOSITION OF HEXANE FRACTION IN PLATFORMING FOR BENZENE PRODUCTION**

| Compound— | Charge | Product |
|---|---|---|
| 2,2-dimethylbutane | 0.7 | 4.9 |
| 2,3-dimethylbutane | 2.6 | 6.0 |
| 2-methylpentane | 19.5 | 30.2 |
| 3-methylpentane | 19.4 | 23.1 |
| n-hexane | 57.8 | 35.8 |
| | 100.0 | 100.0 |

It can be seen that the product contains hydrocarbons with higher extents of branching than the charge. In addition, the recovery of the $C_6$ paraffins based on the $C_6$ paraffins in the charge amounts to about 94 per cent indicating a relatively small loss to lower hydrocarbons.

The all-over conclusion reached from the above information is that the petroleum industry can provide quantities of benzene in excess of the foreseen demand without affecting the motor-fuel supply from the standpoint of either quantity or octane number.

## Toluene

Similar calculations have been carried out on the availability and potential production of toluene. We have prepared a table of composition of what we call a pre-toluene fraction, and the information is shown in Table 4.

It will be observed that the 185°-220° F. fraction from various straightrun gasolines has a total naphthene content varying from 27 to 74 per cent. This concentration is higher than that of the naphthenes in the benzene fraction, and the concentration of the particular fraction is also greater than the corresponding prebenzene fraction of the straightrun gasoline. Going through the same calculations involving the concentration of the naphthenes, the shrinkage in the conversion to toluene, and the conversion efficiency, we find that from straightrun and natural gasoline the potential production of toluene amounts to approximately 1,600,000,000 gal. per year or roughly 2½ times greater than the benzene production.

**Commercial test.**—In order to prove the operability of the conversion of the naphthene-containing fraction to toluene, a great many laboratory and pilot-plant runs have been made. In addition, a commercial test was made at Old Dutch Refining Co. to provide full scale Platforming data. A U.O.P. Platforming unit comprises a feed-preparation column and naphtha heater, fixed-bed reactors in series with provisions for reheating between the reactors, high-pressure separator, stabilizer, and the recycle gas system. In order to prepare the unit for the toluene production, the only change made was the rearrangement of the piping around the feed preparation column so that this column could serve as a product column following the stabilizer. Thus the stabilized Platformate could be rerun to separate a bottoms product, a toluene concentrate, and as an overhead product, a light platformate.

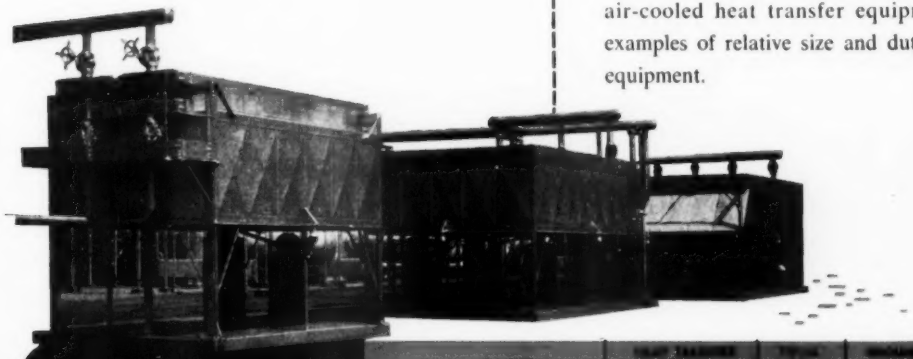
In normal motor-fuel operation of the Old Dutch Platforming unit, the naphthene content of the feed is about 30 per cent. The naphthene content of the fraction from which toluene was to be made was about 60 per cent, and for this reason it was felt desirable to recycle a light fraction to the unit and thus provide for a reduction in the over-all endothermicity of the reaction. The results obtained are shown in Table 5 from which it can be observed that the conversion to a

**TABLE 4—COMPOSITION OF 185°-220° F. FRACTIONS FROM VARIOUS STRAIGHTRUN GASOLINES (From Reference 2)**

| Hydrocarbon, Vol. % | Source: Ponca Okla. | East Texas | Bradford Pa. | Greendale Mich. | Winkler Texas | Midway Calif. | Conroe Tex. |
|---|---|---|---|---|---|---|---|
| Paraffins | 47 | 38 | 52 | 66 | 65 | 20 | 23 |
| 1,1-Dimethylcyclopentane | 2 | 2 | 2 | 2 | 4 | 3 | 2 |
| tr 1,3-Dimethylcyclopentane | 15 | 16 | 6 | 3 | 10 | 26 | 6 |
| tr 1,2-Dimethylcyclopentane | 5 | 6 | 6 | 1 | 8 | 10 | 1 |
| Methylcyclohexane | 21 | 27 | 24 | 18 | 10 | 30 | 36 |
| Ethylcyclopentane (est.) | (3) | (4) | (4) | (3) | (1) | (5) | (3) |
| Toluene | 7 | 7 | 6 | 7 | 2 | 6 | 27 |
| Total naphthenes | 46 | 55 | 42 | 27 | 33 | 74 | 50 |
| Per cent of 185°-220° F. fraction based on $C_5$-360° F. gasoline | 23 | 25 | 24 | 23 | 18 | 20 | 27 |

# Here are 15 TYPICAL APPLICATIONS for FIN-FAN AIR-COOLED Heat Exchanger Equipment

For many years, Fin-Fan Air-Cooled Heat Exchangers have proved their worth by giving reliable, economical service in many and varied applications. The Fluor Corporation, Ltd., and Griscom-Russell Company, pioneer-partners in the air-cooled heat transfer field, offer the following to show the large variety of practical applications for air-cooled heat transfer equipment and examples of relative size and duty of such equipment.



| SERVICE | HEAT TRANSFERRED (BTU/HR.) | TUBE LENGTH (FT.) | BUNDLE SIZE |
|---|---|---|---|
| **GAS COOLING** | | | |
| Natural Gas After-Cooler | 13,920,000 | 80 | 46' x 25' |
| Manufactured Gas Cooler | 11,165,000 | 50 | 23' x 21' |
| Natural Gas After-Cooler | 3,400,000 | 15 | 11' x 21' |
| Natural Gas Inter-Cooler | 7,890,000 | 40 | 23' x 21' |
| **VAPOR CONDENSING** | | | |
| Reflux Condenser | 18,407,000 | 90 | 48' x 25' |
| Primary Condenser | 4,652,000 | 40 | 11' x 25' |
| Still O.H. Condenser | 4,875,000 | 34 | 16' x 21' |
| Debutanizer Condenser | 11,930,000 | 60 | 23' x 25' |
| Still Reflux Condenser | 39,110,000 | 60 | 46' x 25' |
| Steam Condenser | 87,300,000 | 300 | 138' x 31' |
| Steam Condenser | 2,880,000 | 10 | 10' x 6' |
| **LIQUID COOLING** | | | |
| Vegetable Oil Cooler | 628,000 | 15 | 6' x 17' |
| Absorption Oil Cooler | 14,915,000 | 100 | 32' x 17' |
| Quenching Oil Cooler | 1,665,000 | 50 | 23' x 25' |
| Amine Solution Cooler | 19,300,000 | 175 | 38' x 25' |
| Stabilized Crude Cooler | 125,100,000 | 700 | 315' x 25' |
| Jacket Water | 2,400,000 | 5.5 | 16' x 12' |
| Jacket Water | 28,800,000 | 100 | 70' x 24' |

A new 8-page bulletin on Fluor-GR Fin-Fan Heat Exchangers is now being prepared. Write in and reserve your copy by post card or letter.

## *Why Fluor-GR Fin-Fans Lead The Field*

The Fin-Fan Air-Cooled Heat Exchanger is unique in its development and manufacture. It is the result of the engineering skill of *two* companies, *each* long recognized as leaders in their respective fields. It combines Fluor's experience in the design, fabrication and field erection of air-moving systems with Griscom-Russell's experience in heat transfer.

Success is evident in repeat orders. Since 1941, hundreds of Fluor-GR Air-Cooled Heat Exchangers have been installed throughout the world . . . nearly 70% have been repeat orders!

**FLUOR**

BE SURE WITH FLUOR

ENGINEERS • CONSTRUCTORS • MANUFACTURERS

THE FLUOR CORPORATION, LTD., 2500 S. Atlantic Blvd., Los Angeles 22, Calif., *Offices in principal cities in the United States*
REPRESENTED IN THE STERLING AREAS BY: Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1., England

TABLE 5—RESULTS OF TOLUENE PRODUCTION RUN ON OLD DUTCH PLATFORMING UNIT

| | Test I | | | Test II | | |
|---|---|---|---|---|---|---|
| | barrels day | volume per cent | weight per cent | barrels day | volume per cent | weight per cent |
| Fresh feed | 605 | 100 | 100 | 779 | 100 | 100 |
| Separator gas | | | 8.2 | | | 7.9 |
| Stabilizer gas | | | 5.8 | | | 6.5 |
| Light platformate (net) | 169 | 28.0 | 27.0 | 185 | 23.8 | 22.2 |
| Heavy platformate | 310 | 51.3 | 59.0 | 434 | 55.7 | 63.4 |
| | | | 100.0 | | | 100.0 |

heavy platformate amounted to 59 and 63 per cent respectively in two tests along with 27 and 22 per cent of light platformate. In view of the fact that the column used in separating the light from the heavy platfromate was not suitable for a toluene separation, some toluene appeared in a light platformate. Table 6 shows the analyses of the light platformate

TABLE 6—LIGHT PLATFORMATE COMPOSITION, WEIGHT PER CENT OF CHARGE

| | Test I | Test II |
|---|---|---|
| $C_4H_{10}$ | 1.0 | 1.0 |
| $i\text{-}C_5H_{12}$ | 2.1 | 2.7 |
| $n\text{-}C_5H_{12}$ | 1.2 | 1.4 |
| $C_6$ and $C_7$ P+N* | 14.3 | 12.8 |
| Benzene | 0.9 | 0.9 |
| Toluene | 7.5 | 3.4 |
| | 27.0 | 22.2 |

*Paraffins and naphthenes.

indicating a certain toluene carryover, while Table 7 shows the product distribution of the heavy platformate.

TABLE 7—HEAVY PLATFORMATE, COMPOSITION, WEIGHT PER CENT

| | Test I | Test II |
|---|---|---|
| Toluene | 48.3 | 49.9 |
| Ethylbenzene | 1.2 | 1.3 |
| Meta Xylene | 3.6 | 3.9 |
| Para Xylene | 1.8 | 1.3 |
| Ortho Xylene | 1.2 | 1.3 |
| $C_7$ and $C_8$ P+N* | 2.9 | 5.7 |
| | 59.0 | 63.4 |
| **Heavy platformate, composition, volume per cent** | | |
| Toluene | 81 | 77 |
| Ethylbenzene | 2 | 2 |
| Meta Xylene | 6 | 6 |
| Para Xylene | 3 | 2 |
| Ortho Xylene | 2 | 2 |
| $C_7$ and $C_8$ P + N* | 6 | 11 |
| Gross molal yield of Aromatics, per cent of theoretical | 95 | 91 |

*Paraffins and naphthenes.

### Xylenes and Ethylbenzene

The residual naphthenes in the light and heavy platformate have not yet been determined, but based on the toluene yields the efficiency is at least 95 per cent of the theoretical. These data indicate the ease of conversion of the $C_7$ naphthenes into toluene by the Platforming process. Calculations have been made on the potential production of xylenes and ethylbenzene from straightrun and natural gasoline, and it has been found that the total potential production exceeds toluene and amounts to about 2,000,000,000 gal. of these aromatics per year. The conversion of the $C_8$ naphthenes to aromatics proceeds as readily as the conversion of the $C_7$ naphthenes to toluene, as shown by a number of Platforming runs. It was found that the xylene concentrate has a normal distribution of ortho, meta, and para-xylenes and ethylbenzene, and this particular fraction has an exceedingly high rich aviation performance number which makes it a suitable blending agent for increasing the production of the 115-145 grade aviation gasoline.

Table 8 shows the composition and performance of a heavy platformate produced directly as a bottoms fraction by Platforming a medium-boiling naphtha from straightrun gasoline.

**Catalyst properties.**—There are a number of points which should be considered in connection with the conversion of naphthenes to aromatics. The first and most important is that the catalyst should possess the power to convert both $C_7$ and $C_8$ rings to aromatics. If only $C_8$ rings are converted, approximately half of the potential aromatics are lost. Second, the operating conditions and catalyst properties must be such that undesirable and relatively irreversible side reactions such as ring opening and demethylation are minimized. Third, long catalyst life is economically necessary and for this reason operating conditions and catalyst properties must be such that catalyst carbonization is avoided.

We have found that all of these conditions are met in the production of aromatics by the Platforming process.

TABLE 8

| | |
|---|---|
| **Heavy platformate composition, volume percent** | |
| Ethylbenzene | 7 |
| Meta xylene | 30 |
| Para xylene | 13 |
| Ortho xylene | 22 |
| Higher aromatics | 17 |
| Paraffins and naphthenes | 11 |
| **Octane numbers** | |
| F-3 clear | 100 |
| +4.6 cc. TEL/gal. S + 0.35 cc. TEL/gal. | |
| F-4 + 4.6 cc. TEL/gal. over S + 6 cc. TEL/gal. | |
| A.G.A.C. blending index* | 202 |

*20 per cent heavy platformate in alkylate-isopentane blend.

### References


1. L. A. Schlueter—Address presented before the Synthetic Organic Chemicals Manufacturers Association, New York, March 15, 1951.

2. Forziati, A. F., Willingham, C. B., Mair, B. J., and Rossini, F. D., Petroleum Refiner 22, 112, (1943) November.


# Production of Aromatics From Natural Gas Liquids


**by C. R. Williams* and R. E. Sutherland†**


NATURAL-GAS liquids is a term applied to all liquids produced by the natural-gasoline and cycling-plant operations. Natural-gas liquids have been investigated as a source of raw material for the production of aromatics. In Table 1 are listed the potential quantities of benzene, toluene, and $C_8$ aromatics that can be produced by Platforming these stocks. It should be noted that there is a variation in the range of concentration of naphthenes, from which the aromatics are produced, from 20-40 per cent in the $C_6$-$C_7$-$C_8$ fractions. These stocks also show a fairly wide range of aromatics concentrations present in the various fractions.

In Table 2 are the tabulated results obtained when the $C_8$ fraction of a light natural gasoline is Platformed to produce benzene. Also shown is the quality and quantity of material that remains after the benzene is extracted.

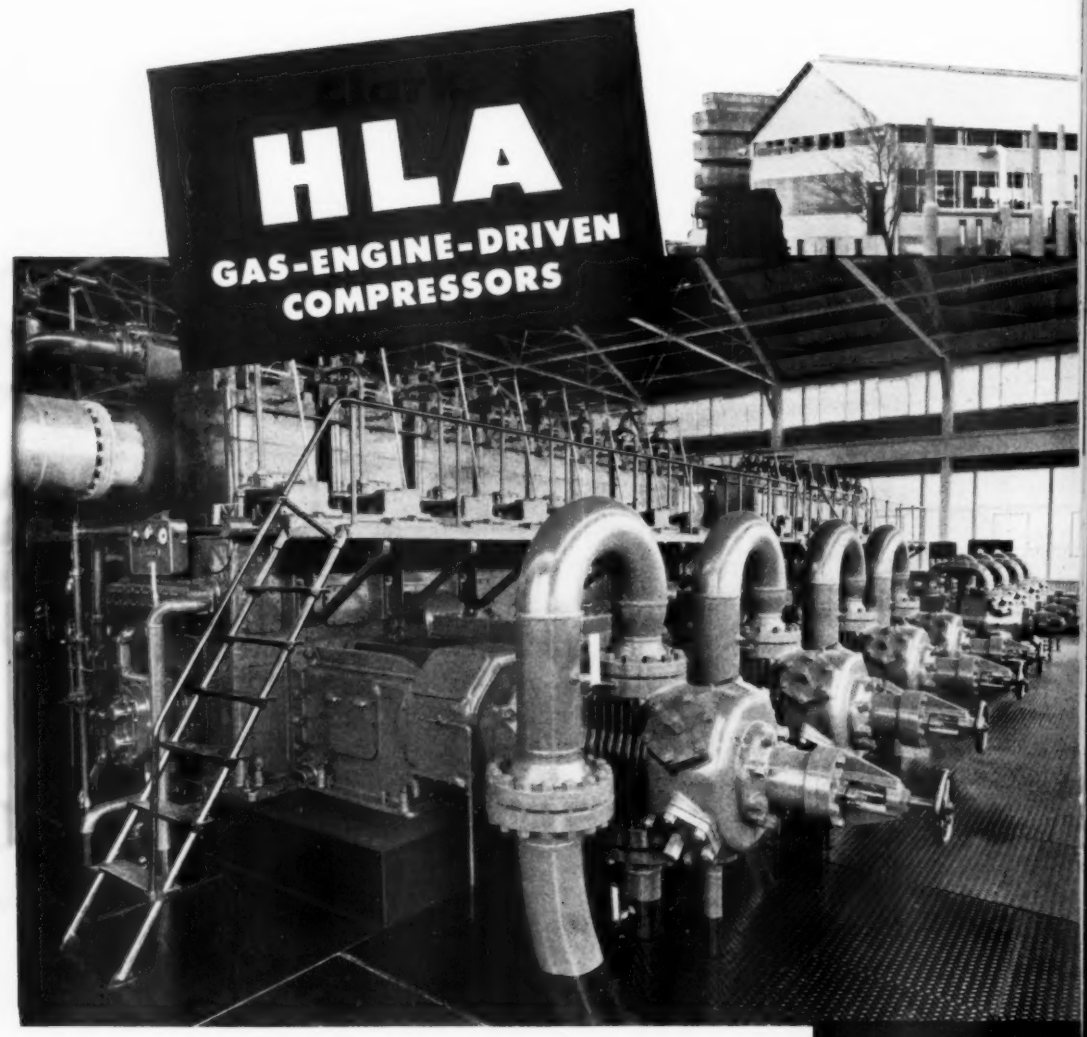
**Process arrangement.**—This operation is carried out as shown in the process flow diagram in Fig. 1. In this diagram the $C_5$ to end point material is charged to a prefractionator in which the $C_5$ and lighter is removed overhead and the $C_6$ fraction is taken off as a side cut. The $C_6$ fraction is charged to the Platformer reaction section and then to a stabilizer for removal of $C_5$ and lighter materials which have been formed in the reaction. The stabilizer bottoms is charged to the extraction system for benzene recovery, and the raffinate is then blended with the remaining natural gasoline and a benzene of high purity is sent to storage. The flow arrangement is approximately the same when benzene and toluene are produced simultaneously. The change in operation requires that the prefractionator in the unit be operated to remove a $C_6$-$C_7$ fraction as side cut for charge to the reaction section. The remainder of the operation remains the same, with the exception that the additional fractionating column is provided following the extraction system for separation of the benzene and toluene.

The same equipment and flow ar-


*Pacific Northwest Pipeline Corp. †Universal Oil Products Co. Presented at annual meeting of N.G.A.A., Tulsa.

IDECO
ONE OF THE DRESSER INDUSTRIES
"FIELD-PROVED"
OILFIELD EQUIPMENT
NOW available at all
Iverson Supply Stores
SALEM
FARMINGTON
TULSA
OKLAHOMA CITY
OKMULGEE
ARTESIA
SNYDER
ODESSA
KERMIT
HOUSTON
Silver Anniversary
IVERSON SUPPLY CO.
1951
A great new name has been added to our outstanding list of oil field supplies. Famous Ideco drilling, servicing and production equipment is now available at all of Iverson's conveniently located supply stores. And that's another good reason why men in search of quality products and superior service head for an Iverson store!
MEMO
IVERSON distributes IDECO "Field-Proved" Pumping Units.
Sig Iverson
OFFICES:
FORT WORTH
HOUSTON
IVERSON SUPPLY COMPANY
DRILLING-PRODUCTION AND REFINERY EQUIPMENT
P. O. BOX 1429
TULSA 1, OKLA.
OFFICES:
MIDLAND
TEXAS

# HANDLES MORE GAS THRU-PUT..




Clark HLA, 2000 bhp, gas-engine-driven compressor, equipped with air cooled compressor cylinders, installed in Panhandle Eastern's Tuscola, Ill. station. Note one of three Clark BA, 1600 bhp standard compressors in the background. The floorspace and foundation required by the more powerful HLA is exactly the same as for the older BA unit.

***SEE the difference in...***

**CLARK**

# ...in less floorspace, with less fuel

To gain greatest possible gas thru-put within the least floor area, Panhandle Eastern Pipe Line Co. is expanding the facilities of its main line stations at Tuscola, Ill., Zionsville and Edgerton, Ind. with 8 Clark HLA, 2000 bhp, Super 2-Cycle, High Compression, Gas-Engine-Driven Compressors.

And the first of these units, in operation since January 1951, is truly a milestone in heavy duty compressor history! For, with this installation began a new era of opportunities for gas transmission pipelines and other applications: Unprecedented savings in space, resulting from increased power per square foot of floor area; unmatched fuel economy resulting from Clark high compression design; unrivaled simplicity and accessibility resulting from vertical, in-line power cylinders.

Being the first to install the Clark HLA, it's only natural that Panhandle Eastern would be among the first to take advantage of another recent Clark development, too . . . the air cooled compressor cylinder, thus assuring greatest attainable compressor efficiency.

With more than 100,000 bhp on order or being installed by the country's leading pipeline companies within a few months after its introduction, the position of the HLA as the leader in its field is clear.

Complete information on the four models, covering a range of 1250-2500 bhp, is obtainable in New Catalog No. 113, and from your nearest Clark representative.

**COMPRESSORS**

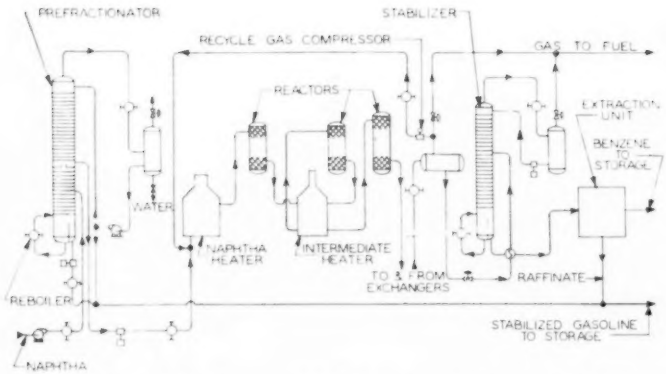



*Fig. 1—Simplified flow diagram of U.O.P. Platforming unit (aromatics production).*

rangement are used when benzene, toluene, and xylene are produced simultaneously and as the toluene and xylenes are used for aviation gasoline they normally need not be separated. In the event the benzene, toluene and xylenes are to be produced as separate fractions, an additional fractionation is necessary.

The effect of the production of benzene, or benzene and toluene on the octane of the gasoline is shown on Tables 2 and 3. The octane number of the gasoline after removal of the aromatics produced by Platforming is approximately the same as the gasoline charged. The volatility of the gasoline is also about the same as the production of butane is relatively small. A part of the potential octane increase is, of course, given up with the removal of the aromatics. The explanation for the same octane of the stock is that the low octane normal $C_6$ and normal $C_7$ have been partially converted to the higher octane isomers.

**TABLE 1—POTENTIAL YIELDS OF AROMATICS BY PLATFORMING**

| Gasoline splitup, L.V. % of $C_5$ e.p.: | Natural gasoline: East Texas light | Natural gasoline: Carthage heavy | Natural gasoline: California | Natural gasoline: East Texas Lake Creek | Katy cycling plant distillate |
|---|---|---|---|---|---|
| $C_5$ | 44.6 | 20.7 | 11.5 | 38.4 | 20.6 |
| 115°-150° F. | 10.9 | 10.9 | 1.5 | 10.8 | 3.8 |
| 150°-185° F. (benzene makers) | 17.5 | 14.3 | 18.2 | 16.2 | 13.6 |
| 185°-220° F. (toluene makers) | 14.6 | 17.6 | 33.8 | 16.5 | 19.7 |
| 220°-270° F. (xylene makers) | 7.7 | 16.1 | 24.6 | 9.3 | 14.6 |
| 270° F. e.p. | 4.7 | 20.4 | 10.4 | 8.8 | 27.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total potential aromatics, L.V. % of $C_5$ e.p.: | | | | | |
| $C_6$ cut: | | | | | |
| Converted naphthenes | 5.3 | 1.6 | 6.5 | 5.4 | 4.7 |
| Natural benzene | 1.1 | 4.3 | 0.5 | 0.5 | 0.9 |
| Total benzene | 6.4 | 5.9 | 7.0 | 5.9 | 5.6 |
| $C_7$ cut: | | | | | |
| Converted naphthenes | 5.6 | 2.9 | 16.1 | 7.2 | 7.8 |
| Natural toluene | 0.8 | 1.5 | 2.1 | 1.1 | 2.0 |
| Total toluene | 6.4 | 4.4 | 18.2 | 8.3 | 9.8 |
| $C_8$ cut: | | | | | |
| Converted naphthenes | 2.1 | 2.3 | 11.6 | 3.3 | 3.5 |
| Natural xylenes | 1.5 | 1.1 | 1.9 | 0.9 | 2.9 |
| Total xylenes | 3.6 | 3.4 | 13.5 | 4.2 | 6.4 |

**TABLE 2—BENZENE PRODUCTION BY PLATFORMING OF A $C_6$ FRACTION OF NATURAL GASOLINE**
(Yields and Properties)

| | Debut. nat. gaso. $C_5$ e.p. (vol. %) | Reactor charge (vol. %) | $C_5$ e.p. Platformate (vol. %) | Total $C_5$ e.p. blended gaso. after benzene extraction (vol. %) |
|---|---|---|---|---|
| i-Pentane | 23.5 | | 0.1 | 23.6 |
| n-Pentane | 21.2 | | 0.1 | 21.3 |
| $C_6$-150° F. fraction | 10.8 | | 5.2 | 10.6 |
| 150°-185° F. fraction | 17.5 | 17.5 | 4.5 | 9.9 |
| $C_7$ e.p. fraction | 27.0 | | | 27.0 |
| Benzene | | | 5.3 | |
| | 100.0 | 17.5 | 15.6 | 92.4 |
| Gas production, standard cu. ft. per bbl. reactor charge | | | | 1,140 |
| Net heating value, B.t.u. per standard cu. ft. | | | | 575 |
| Inspection data: | | | | |
| °A.P.I. | 75.0 | 66.4 | | |
| R.v.p. | 9.9 | | | |
| Molecular weight | 82.0 | 84.6 | | |
| Octane numbers: | | | | |
| Research (F-1), clear | 68.0 | 63.5 | | 68.5 |
| +3 cc. TEL | 86.5 | 83.5 | | 87.5 |

**Economics.**—The economics of the operation for benzene production is shown in Table 4. This operation is carried out on the basis that 300 bbl. per day of benzene is to be produced. The yields and products used are those shown in Table 2. The reactor charge is set up on the basis of 980 bbl. per day charge to the reactor section. This operation requires that the total light debutanized natural gasoline in the amount of 5,630 bbl. per day be provided. With the prices of benzene which are presently being quoted this operation shows a satisfactory payout.

The same sort of economics will apply for the benzene-toluene case and the operating cost of the Platformer will be lower on a per barrel basis because for any supply of total charge stock the reactor charge will be larger.

An alternative procedure has been considered where fairly large quantities of benzene exist in the natural gasoline, as is the case for the Carthage stock shown in Table 1. This operation contemplates the recovery of the benzene and Platforming of the remaining 180°-400° F. stock to make a satisfactory motor fuel. The benzene in the feed can be removed by the addition of a fractionating column and a benzene extraction system.

For the Carthage heavy natural gasoline approximately 400 bbl. of benzene is recovered, and the research octane of the finished product drops from 93 obtained without benzene recovery to about 92.8. Motor-fuel production with benzene recovery is 9,200 bbl. per day. This amount of benzene at a price of 45 cents per gallon represents an additional income of $7,550 per day with relatively small additional capital investment.

In one of the larger gas-distillate fields of Texas a processing company has recently been reported to have made arrangements with several plant operators to gather the natural gasoline stream from the plants. The material is transported by pipe line to the processing plant. The material is then to be processed through both Platforming and benzene-extraction facilities. This company is reported to have a certificate for accelerated

*(Continued on page 101)*

# WHAT IS THE "Depth Expectancy" OF A LEE C. Moore 142 FOOT MAST?

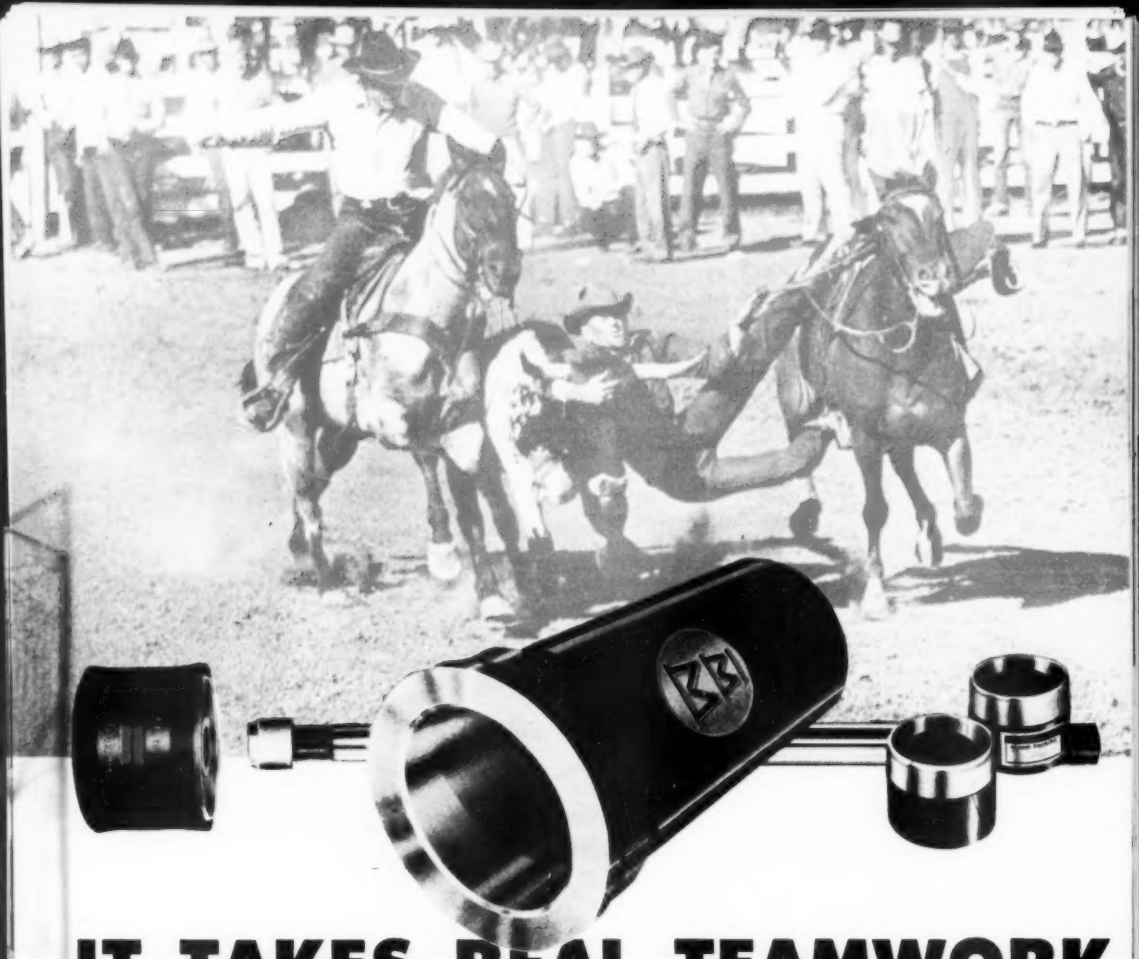
Experience in drilling with a Moore 142 foot mast shows that depths far below average can be reached. Wells below 15,500 feet have already been drilled with this big mast.

Lee C. Moore Big Masts are designed for big jobs. So far no job has been too big. Check their strength, ruggedness and durability, and you'll see why the toughest drilling job is in good hands when you use a Lee C. Moore Big Mast.

LEE C. MOORE CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH

Export Office — 9 Rockefeller Plaza, New York 20, N. Y.



# IT TAKES REAL TEAMWORK

**to wrestle steers . . . and to assure *efficient* slush pump operation**

Barehanded throwing of wild steers is so daring and dangerous a sport that it long ago became the "big wallop" of every rodeo. Successful steer wrestling demands precision teamwork by hazer, wrestler, and horses.

Efficient slush pump operation also requires precision teamwork. Piston, Rod, Liner and Packing must be in perfect alignment, have perfect fit, and work together with perfect mechanical precision! Valves must be rugged and efficient.

We have perfected the new MISSION "Super Service" Liner . . . accurately bored, ***induction*** hardened to ***uniform*** case thickness, precision honed, and "Satin Finished" . . . to enable you to obtain the same top quality in liners that you obtain in MISSION Pistons, Rods, Packing and Valves. These products constitute a perfectly mated "MISSION team" of expendable slush pump parts, ***unbeatable*** for economical slush pump service. Your supply store handles them . . . Mission Manufacturing Co., Houston, Texas. Export: 30 Rockefeller Plaza, New York. European Address: London, England.

Mission Silver Top Valve for Normal Pressures

Mission Super-Service Valve for High Pressures

MISSION MANUFACTURING CO

# WATER FLOODING PAYS OFF

## . . . in South Ward, Texas Field

by George L. Buckles

### Introduction

THE above title was given to the writer by the Texas Petroleum Research Committee. In order to keep the paper from being a stereotyped factual history, it developed the writer was compelled to digress materially from the wording of the subject. Actually, some of the material contained in this paper was acquired through years of water-flooding experience, both by the writer and Forest Oil Corp.

The purpose of this paper then is not merely to give the case history to date of the water-flood operations in South Ward field. It is rather to explain the efforts of the operator to find some answers to questions that have been in controversy since water was first used as a secondary-recovery medium.

The author is petroleum engineer with Forest Oil Corp., Monahans, Tex. This paper was presented at the recent Second Oil Recovery Conference held at Texas A. & M. College, College Station, Tex., under the sponsorship of the Texas Petroleum Research Committee. Other papers recently published from this Texas Petroleum Research Committee-Texas A. & M. College conference were "Capillary Properties of Some Limestone Cores," by R. L. Whiting and E. T. Guerrero, July 26, 1951, issue, pages 272 et seq., and "Five Years of Gas Injection at West Pampa," by F. J. Neslage, August 2, 1951, pages 58 et seq.

### Conclusions

These are not set out as irrefutable facts, but are strong indications derived from an impartial view of evidence at hand.

1. The Yates sands in the Permian basin show remarkable response to water flooding.

2. Unreserved cooperation along lease boundaries is essential to maximum recovery from the reservoir. Also lease boundaries can be protected by 20-acre spacing without drilling line wells. By using 20-acre spacing, any size lease with an even number of 10-acre locations can be incorporated in a floodable pattern without the necessity of unitization.

3. Enclosed acreage is more important than distance between input and producing wells and pattern defines the acreage affected by the flood.

4. After floodable characteristics are established, chip coring gives more and better information than rotary or conventional cable-tool methods.

5. With equal time and distance a flood should be balanced by equal bottom-hole pressures rather than by some arbitrary volume ratio.

6. The optimum flooding pressure on the Gordon lease is indicated to be below 0.6 psi. per foot in depth. This would be below 500 psig. at the well head.

7. Where applicable, water flooding is the most efficient economical method of producing oil.

8. It takes infinite patience and excellent supervision in the field to successfully conduct a water flood.

9. The major portion of the success of any water flood is due to the completion of water input wells. This being true, the major portion of the money and effort should be expended in the bottom of the hole rather than on the surface where it can be seen. Gravel packing water input wells, as practiced by the operator, is superior to an open hole completion.

DEFINITIONS of the flood program are as follows: Flood No. 1 refers to input wells 1-C, 2-C, 3-C, 4-C, 5-C, and 6-C (Fig. 1); and the 10 nearest producing wells 4, 5, 7, 9, 11, 12, 15, 19, 37, and 38.

Flood No. 2 refers to input wells 107-C, 108-C, 111-C, 112-C, 113-C, 115-C, 116-C, 118-C, and 119-C; and the twelve nearest producing wells 6, 10, 14, 17, 18, 21, 24, 27, 28, 31, 32, and 34.

Water injection to Flood No. 1 or Flood No. 2 refers to total water; no attempt has been made to differentiate between total injected volumes and net effective volumes, by some theoretical method of allocation.

Enclosed wells refer to producing wells completely surrounded by four input wells. Wells with a two-way push refer to wells being affected by only two input wells. A one-way push refers to a line flood or a producing well that is affected by only one input well.

#### General Comment

Prior to development of Flood No. 1 no conclusive evidence was available as to the floodable characteristics of any of the fields in the Permian basin. All that was known was that there were several gas-expansion fields approaching economic limit by primary producing methods. Several floods had been attempted and several more were in process of being developed. None had proved successful at that time and some had been discontinued as failures.

Starting with the fundamental premise that water flooding consists only of putting the right water where it should go, continuously with the right pressure, no side issues were allowed to enter which might deviate the operation from a fixed objective.

Flood No. 1 was planned and carried out with the express purpose of finding out how successfully to flood the sand fields of the Permian basin. Or, conversely, to eliminate any procedure that would invite or provoke a failure.

Fortunately from a scientific standpoint, Flood No. 1 and Flood No. 2 were developed and operated in such a manner that definite conclusions are available if properly interpreted. This is in contrast with most floods which are progressively developed. For example, water was started into the six input wells of Flood No. 1 at the same time. Injection was maintained at a constant rate until 750-psi. plant pressure was reached. Pressure was then reduced and constant rate was maintained at 500 psi. plant pressure until the present time.

Water was started into the nine input wells in Flood No. 2 at the same time. Constant plant pressure was maintained from the beginning at 175 psi. with decreasing volumes at the input wells. All input wells in each flood were subjected to the same well-head pressures. In other words, volumes were not regulated as between wells. Consequently, from an observational standpoint we have normal field conditions and ideal operating conditions. By normal field

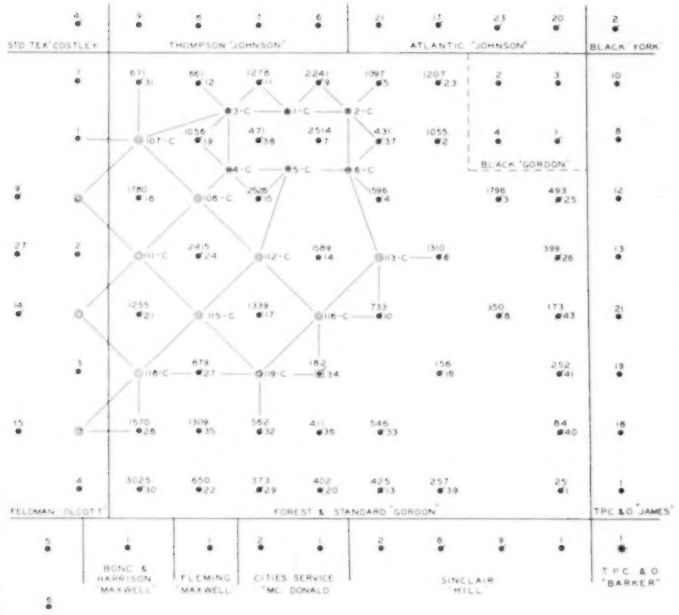



*Fig. 1—Water-flood development plan followed at South Ward. Flood No. 1 refers to input wells 1-C, 2-C, 3-C, 4-C, 5-C, and 6-C, and producing wells 4, 5, 7, 9, 11, 12, 15, 19, 37, 38. Flood No. 2 comprises input wells 107-C, 108-C, 111-C, 112-C, 113-C, 115-C, 116-C, 118-C, 119-C, and producing wells 6, 10, 14, 17, 18, 21, 24, 27, 28, 31, 32, 34.*

conditions we mean erratic; with sand thickness varying from 7 to 37 ft. and permeabilities from an average of 4 to 160 md. per well.

### The Pay Formation

South Ward field is one of a series of elongated anticlinal structures extending from north central Pecos County, through Ward and Winkler counties in Texas and well into Lea County, New Mexico. The regional location is on and parallel to the southwest edge of the Central Basin platform in the Permian basin. The formation itself is the Yates sand of Upper Permian age.

In South Ward field the Yates is divided into two main sand zones which are divided by about 40 ft. of dolomite and very thin sand stringers. The two zones are known locally as the Grand Falls and the Penn-Bennett sands. The upper (Grand Falls) has a thickness of about 180 ft. including the dolomite at the base, and the lower (Penn-Bennett) has a thickness of about 70 ft. The sand members themselves consist of a fine-grained, well-sorted, fairly well-cemented quartz sand. The cementing material is principally dolomite.

The Penn-Bennett sand is the zone being flooded. In the portion of the lease now being flooded the net pay thickness varies from 7 to 37 ft. The average is about 18 ft. The top of the sand is encountered at an average depth of 2,430 ft. The bottom extends to as low as slightly below 2,500 ft.

### Primary Production

The Gordon lease has 600 productive acres. Forty-two wells were drilled from 1931 to 1938. Total primary production was 2,433,648 bbl. or 4,056 bbl. per acre. Production varied from 9,000 to 110,000 cumulative barrels per well for an average of 57,944. Six wells had been plugged and abandoned at the time water flooding commenced. The production for November 1949 was 1,265 bbl. from 10 operated wells for an average of 4.2 bbl. per day per operated well.

### Brief History of Flood No. 1

For a quick answer it was decided to drill six input wells to enclose two 10-acre five spots. Core test No. 1-C was started in September 1948. By August 1949 the six input wells had been completed; the water filtration and treating plant was ready for operation and injection was started August 16, 1949. Injection rates were maintained at an average of 5,800 bbl. per day for the six wells. By December 13, 1949, wells No. 7 and No. 38 were equipped to produce. At that time 404,455 bbl. had been injected into the six wells for an average of 67,409 bbl. per well. By February 12, 1950, the other eight wells adjacent to the input wells were put into operation.

As will be shown subsequently, Flood No. 1 consists of 35 acres. As of April 7, 1951, Flood No. 1 had produced 283,722 bbl. of water-flood oil. This amounts to 8,106 bbl. per acre. Assuming 18 ft. of net pay sand, this amounts to 450 bbl. per acre-foot. With an average of 40 per cent pore space saturation at start of flood, this results in a present residual oil saturation of 12.4 per cent of pore space. As of the same date 2,792,602 bbl. of water had been injected into Flood No. 1. Flood No. 1 is currently producing 200 bbl. of oil and 2,900 bbl. of water per day.

The outstanding well in Flood No. 1 is No. 7 which has produced 98,383 bbl. of oil and is currently producing 50 bbl. of oil and 650 bbl. of water per day.

### Brief History of Flood No. 2

From experience gained in Flood No. 1 it was decided to expand the operations on 20-acre rather than 10-acre spacing. A line agreement was made with our neighbors to the southwest, wherein we drilled three input wells (107-C, 111-C, 118-C) on regular 10-acre locations on the Gordon lease and three corresponding wells were drilled on alternating 10-acre locations on the adjoining lease. We then drilled and equipped the other six input wells in Flood No. 2 and started injection August 27, 1950. Well No. 24 was equipped to produce September 22, 1950, but all of the 12 producing wells in Flood No. 2 were not put into operation until March 22, 1951.

Flood No. 2 consists of approximately 135 effective acres. As of April 7 Flood No. 2 had produced 266,197 bbl. of oil and no water. This amounts to 1,972 bbl. per acre. As of the same date 1,184,705 bbl. of water had been injected into the nine input wells. The current production of Flood No. 2 is 2,050 bbl. of oil per day and no water. The outstanding well in Flood No. 2 to date is No. 24 which has produced 127,559 bbl. of oil and is currently producing 800 bbl. of oil per day and no water.

### Drilling Program, Coring Technique, Laboratory Analysis, Use of Gamma Ray-Neutron Logs

A generalized geologic section (A. B. Gordon No. 1-C) is as follows:

0-200 ft. **Quaternary**—Caliche, sand, and gravel.

200-930 ft. **Triassic** — (Dockum Group)—Red shale, red sand, and a little dolomite.

930-1,200 ft. **Dewey Lake**—(Top of Permian)— Red sand, red shale, and gypsum.

1,200-1,310 ft. **Rustler** — Anhydrite with some dolomite.

1,310-2,020 ft. **Salado** — Salt, anhydrite, and some fine silty sand.

2,020-2,220 ft. **Tansil**—Dolomite and anhydrite.

2,220-2,480 ft. **Yates**—Sand with interstratified thin beds of anhydrite and dolomite.

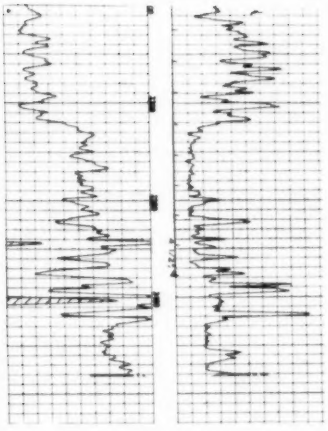


*Fig. 2—Gamma ray-neutron log with pay section between 2,426-2,478 ft.*

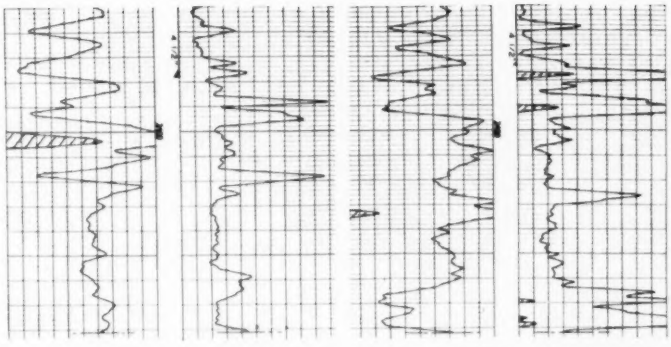


*Fig. 3—Correlation of gamma ray-neutron logs. Left one is Forest Oil Corp. 108-C A. B. Gordon; right one is Forest's 119-C Gordon. These logs are used in working over producing wells and converting existing wells to injection purposes.*

2,480 ft. **Top of Seven Rivers**—Dolomite with small amount of sand.

All of the original 42 wells on the Gordon lease were completed in the Grand Falls (upper) pay sand and most of them in the Bennett (lower) pay sand. Due to high gas-oil ratios in original completions, an upper gas sand or a gas cap in the principal pay sand was indicated. It was decided that we would core both sands in well No. 1-C.

The lower part of the Grand Falls and all of the Bennett sand were diamond cored, using a low-water-loss fresh-water mud. The two sections looked identical and had comparable porosities and saturations. Each pay section showed 15 per cent of pore-space oil saturation. While the permeability in the Grand Falls section was below that of the lower sand, it was sufficient to indicate promising field results. The only real difference noted between the two sands was that in the laboratory we were able to further reduce the saturation in the Bennett sand from 15 per cent to about 8 per cent of the pore space by flooding.

In order to get the final answer as to the actual saturations, well No. 2-C was chip cored through both pay sands. Similar results were obtained as to porosity and permeability determinations between the two sands. However, the upper portion of the Grand Falls sand proved to be a true gas sand while the lower portion of this sand had oil saturations comparable to the rotary core. Only the lower 6 ft. of this sand had saturations above 15 per cent of pore space. The implication is that the lower portion of this sand may develop into a true oil sand if it continues far enough downdip on the structure. The saturations in the lower (Bennett) pay, however, jumped to 44 per cent of the pore space. This was the first indication of what may have contributed to failures in previous flood attempts.

Incidentally, it is believed that rotary cores give residual-oil saturations after water flooding through vertical pore spaces at the static head pressure of the drilling mud, while chip cores give residual-oil saturations by gas expansion to atmospheric pressure. At any rate, it was decided that at this particular datum only the Bennett pay sand could be successfully flooded and in all input wells the Grand Falls was isolated from taking any water.

After the objective pay sand was identified, the limits of any possible thief zones were established. It is common practice now to chip core all new wells. Input wells can be slim-hole drilled, setting 4½-in. o.d. casing for an injection string, and 5½-in. o.d. casing is large enough for producing wells. Rotary tools are used until casing point is reached and the well is completed with cable tools. About 450 ft. of 7-in. casing is cemented to the surface and then 6¼-in. hole is drilled to one of the dolomite streaks just above the Bennett pay sand. Four and one-half inch o.d. casing is cemented at this point. The program is the same for producing wells except that 8⅝-in. o.d. casing is used for surface pipe and 5½-in. o.d. for the production string.

Figs. 2 and 3 will show how gamma ray-neutron logs are used. This type log is run on each new well after coring to be used for correlating purposes in working over and converting existing wells for producing or input purposes. Fig. 2 shows a typical section. The top of the Yates is shown at 2,220 ft. The base of the Grand Falls pay section is at 2,357 ft. The Bennett is from 2,396 to 2,478 ft. with the pay section between 2,426 and 2,478 ft. with a tight dolomitic sand section from 2,455 to 2,466 ft. Note that the 4½-in. casing is set in one of the dolomite stringers above the pay.

Fig. 3 is presented to show how correlation is obtained. The log on the left is a detailed section of the log shown in Fig. 2. The log on the right is from a well farther south and east. The top of the Bennett formation is at approximately the same depth but the upper part of the formation is becoming productive in a south and east direction. The pay section in the well to the right is from 2,414 to 2,464 ft. with several tight dolomitic streaks, the principal one being the 4-ft. interval from 2,425 to 2,429 ft. It will also be noted that the tight dolomitic sand section in the well to the left from 2,455 to 2,466 ft. has developed into a true dolomite in the well at the right. The

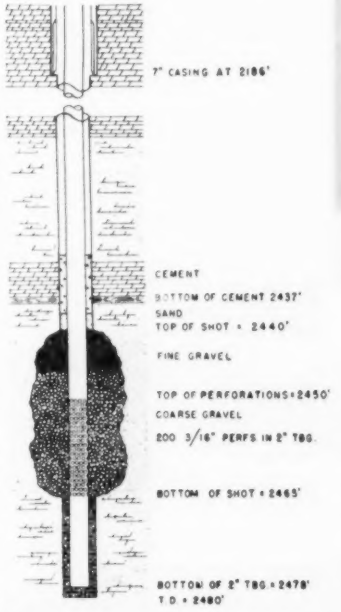



*Fig. 4—Completion details for 2-C A. B. Gordon (water-injection well).*

principal value of these logs is to make positive identification, even though the old producing wells were shot and have liners in them.

### Input-Well Completion

It must be realized that there can be no chance of success in any water flood unless the input wells are completed so that the water is restricted solely to the pay formation. The idea, then, is to include all of the formation that will contribute to forcing oil into the producing wells; and to exclude any formation that would contribute to bypassing water from the input to the producer; or to restricting the flow of water in any manner into the oil-bearing formation. Realizing this is the most important thing we do in water flooding, a method was developed which has proved to meet all of the above requirements.

Fig. 4 shows a drawing of the actual completion of well No. 2-C. Since this well was to be chip cored and no information was available at the time as to the identity of the pay sand, 7-in. casing was set in the Tansil lime above the Yates. The pay sand was identified between 2,440 and 2,464 ft. The well was shot merely to increase the diameter of the hole, and thereby minimize the danger of plugging by increased area in event of a temporary injection of bad water.

The hole was cleaned out to bottom at 2,480 ft. Two-inch tubing, plugged at the bottom, was run to 2,478 ft. This tubing was perforated with 200 ⅜-in. drilled holes from 2,450 to 2,465 ft. A measuring line was run inside the 2-in. tubing to be sure of the location of the perforations. There was a shale streak from 2,432 to 2,434 ft. and it was therefore decided to place the bottom of the cement plug at 2,437 ft.

A string of 1¼-in. tubing was then run outside of the 2-in. tubing to just above 2,437 ft. where it was intended to place the cement. A measuring line was then run through the 1¼-in. tubing to bottom. This line was pulled up into the 1¼-in. tubing and gravel packing on the outside of both strings of tubing was commenced. Five-eighths-inch washed and screened, rounded river gravel is used. The gravel must be larger than the holes in the 2-in. tubing, at least until the fillup is above the perforations. Measurements are made at intervals during the process to check fillup. All quantities of gravel are measured so that a complete caliper survey is obtained.

After the gravel reaches well above the top of the perforations a finer gravel is used and finally sand, until the cementing point is reached. This latter for the purpose of preventing cement from going down into the shot hole or into the perforations. At this point several barrels of water are run into the 2-in. tubing to wash and settle the gravel in the hole.

After allowing time to settle, a measurement is again made on top of the sand. If everything checks, the measuring line is pulled out of the 1¼-in. tubing. Ten sacks of cement are mixed and run through the 1¼-in. tubing by gravity followed with enough water to flush the pipe. Five joints of 1¼-in. tubing are then pulled and an additional amount of water is run through the 1¼-in. tubing. When the cement has been allowed to set sufficiently to support a measuring-line weight, the top of the cement is measured through the 1¼-in. tubing. The tubing is again lowered to the top of the cement and additional cement is added to bring it up to the desired height above the pay sand. The 1¼-in. tubing is then removed and the well is completed, ready for injection.

In this method of completion, all of the pay sand is open at all times for water injection. The pay section cannot cave because of the gravel. A producer can be converted to an input well even though it is necessary to cement in the center of a shot hole. Shale breaks can be disregarded if appearing within the pay section as water is not compelled to flow past them to get to the sand section below. Cement can be placed at any point in the section as a packer seat is unnecessary. A well having two sands can be dually completed by gravel packing the lower sand with 1½-in. tubing and the upper sand with 3-in. tubing. The sands can then be flooded separately by flooding the upper sand through the annulus between the 1½-in. and 3-in. tubing.

Where casing is set in new wells to be used as an injection string, we still gravel pack a string of tubing through the pay section as a liner. For this purpose 1¼-in. tubing is used. A left-thread nipple and coupling is placed about 50 ft. up in the casing. Gravel is placed to a point about 20 ft. up in the casing and the tubing is then unscrewed. No cement is used as the casing is already cemented in.

### Injection Water

Fig. 5 is a simple flow diagram of the water-treating and filtration plant. There is no point in going into a detailed discussion of water treating, since no two waters are alike; and no set procedure can be relied upon beforehand. The water well we are using was drilled with a 20-in. bit to 220 ft. Ten and three-fourths-inch o.d. slotted casing was run to bottom and gravel packed to the surface. Seventy-two yards of gravel was placed around the outside of the casing. The water comes from a fine-grained unconsolidated sand. A bottom-hole turbine-type pump is used with a 40-hp. electric motor on the surface.

Since the well produces some sand it is necessary to use a 500-bbl. settling tank. The tank has a cone bottom for removal of sediment. The water then goes into a 200-bbl. volume tank from which it is pumped through filters to a 1,000-bbl. storage tank.

Chemicals are fed to the water at the intake of the centrifugal pump. The water is a typical West Texas fresh water in that it has a rather high mineral content, mostly carbonates and sulfates. Some magnesium is present but no iron or manganese. It contains an abundance of bacteria and sufficient chlorine is added to leave a residual chlorine content of 0.3 p.p.m. in the finished water. One and one-fourth pounds of sodium tetraphosphate is added per 1,000 bbl. of water to assist in keeping the solids in solution. The water is run through diatomaceous earth filters into a 1,000-bbl. storage tank.

A common intake manifold goes from the storage tanks to the pumps, boosting water to Floods No. 1 and No. 2. Flood No. 1 is operated by two triplex piston-type pumps furnishing at present 3,300 bbl. per day at 500-psi. plant pressure. Flood No. 2 is operated by one centrifugal pump furnishing 2,600 bbl. per day at 173-psi. plant pressure.

The water goes through common distribution lines to the various wells where it is metered at each well head. Connections are arranged at the well to take the well-head pressure at any time. Total injection, well-head pressure, and instantaneous rate readings are recorded daily.

To give some idea of the effectiveness of the water treatment, it is noted that the injection rates in Flood No. 1 have increased 10 per cent from December 1950 until the present with the same well-head pressures. A possible explanation for this is that

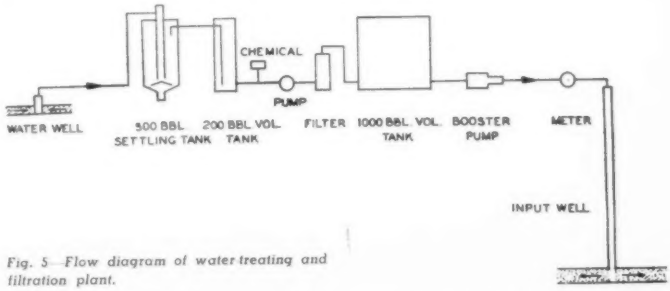



*Fig. 5—Flow diagram of water treating and filtration plant.*

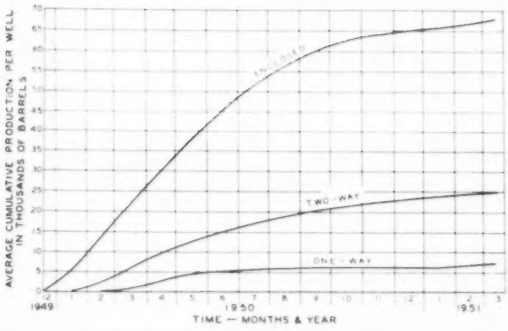



*Fig. 6—Cumulative oil production data for three types of wells located within Flood No. 1.*

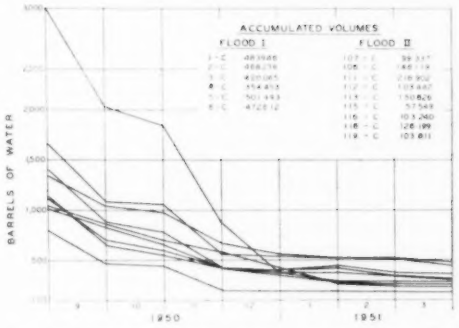



*Fig. 7—Water-injection data, barrels per day versus time, where several input wells were subjected to equal intake pressure.*

as sections of the pay sand flood out, the permeability to water is higher than that to oil. Also we note that the saturation of the return water to carbonates and sulfates is higher than the injected water. This may tend to increase the permeability of the sand.

### Flood Pattern

Fig. 6 shows cumulative production curves for three types of producing wells in Flood No. 1. The enclosed curve is the average production per well for wells No. 7 and No. 38; these being the only two wells in Flood No. 1 that are enclosed by four input wells. The two-way curve is the average production for the five wells being affected by two input wells each. The one-way curve is the average production for wells No. 4, No. 5, and No. 12; being affected by only one input well each.

As of the early part of March 1951, this accumulated production amounted to 67,400, 24,890, and 7,200 bbl. respectively. The only thing wrong with these curves is that there are not enough wells of each type to get a true picture of the ratio of each type of pattern. For example, the upper curve averages one good well against a poor well, as reflected by their primary production curves. The center curve averages four good wells and one poor one. The bottom curve averages two good wells and one poor one.

It is believed that if all of the wells were comparable as to original production, the curves would define the acreage flooded as outlined in Fig. 1. This means then that the enclosed pattern would approximate flooding all of the enclosed acreage or 10 acres per well. The two-way push would flood only 2½ acres and the one-way push slightly less than 1 acre.

If the general spacing were enlarged from 10 to 20 acres, the same general rule would follow except for the one-way push. This would be merely a matter of distance rather than area and would probably be in the ratio of 660/467 times 1 acre.

It is amazing to realize how little the importance of pattern is stressed by oil men in general. The consensus among the inexperienced is that it is only necessary to have input wells in the general neighborhood of the producers.

### Flood Balance

There are only four ways in which an operator would attempt to balance a flood. One is by permeability, another by number of wells, another by pore space, and a fourth by pressure. The first three consider volumes only and disregard pressure. The first two have no merit and will be dismissed quickly. The first would be a ratio of millidarcy-feet in the input wells and would only be a ratio of how much water the wells should take at the instantaneous time of first injection. The second method presupposes the idea that all wells are alike, and could not possibly have any validity toward keeping an even water front as between two or more wells. The third method is based on the assumption that if the total pore spaces are known, the distribution of water should be so regulated that these spaces are filled with fluid at the same time.

The third method mentioned above has some merit, and is the one used by most operators where any attempt at all is made to keep the flood in balance. The usual procedure is to make the ratio of injection rates by the number of feet of net pay sand in each injection well. This is valid since the porosity is always much more uniform than the permeability. The principal objections to this method are that it disregards permeability and takes for granted that the conditions in the input well are distributed in some uniform manner in all directions away from the well.

With equal time and distance it is preferable to balance any flood with equal pressures, regardless of the variety of conditions encountered in different input wells. It has been proved to the satisfaction of the writer through experience that more oil will be produced in this manner.

Fig. 7 shows what happens when each injection well is subjected to the same intake pressure. The curves are rates in barrels per day against time for the nine input wells in Flood No. 2. The instantaneous rates at the start of the flood vary from 800 to 3,000 bbl. per day. The rates at the start vary between wells in almost direct ratio to the millidarcy-feet of each well. At the end of 7 months' operation, the difference in rates had dropped from 2,200 to 300 bbl. per day. This would indicate that conditions away from the well bore tended to average out as between the areas affected by each well.

Fig. 7 also proves that the volume of water any well will take after fillup does not depend upon the permeability or thickness of sand in the well, but the relief it has after leaving the well bore. This relief in reality is the capacity of the producing wells to give up fluid and approaches equality as it reflects relief from the input wells. This same condition is shown in the tabulation of the accumulated volumes shown on Fig. 7 for the input wells in Flood No. 1. These wells were all subjected to the same pressures even though the pressures were varied from time to time. The total volumes are almost equal although there was a great variation in permeability and thickness of sand. Well No. 4-C has been shut in since December 1950.

The real advantage of balancing a flood by equal bottom-hole pressures is that the tight sands will all be subjected to the same pressure and will therefore flood out at the same time. Consequently, when one well floods out completely all other wells will be flooded out.

The water front will conform to the general permeability profile regardless of the pressures used. Any flood regulated by volume alone will result in different pressures applied to the same permeabilities in different wells. Therefore, any flood bal-

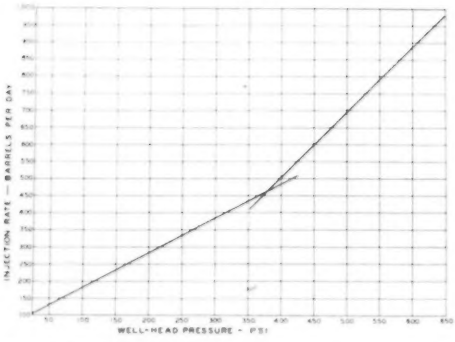



*Fig. 8 — Composite injection-pressure curve for six wells in Flood No. 1.*

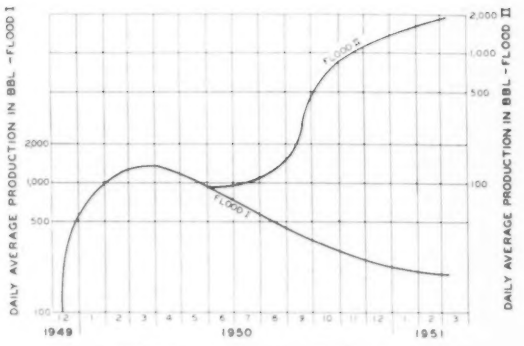



*Fig. 9—Oil-production curves for Floods Nos. 1 and 2.*

anced by volumes will cause an unbalanced condition.

### Pressure

We all know that pressure alone in a water flood does not produce oil. It is a fundamental physical law that pressure differential is necessary for any movements of fluids. Most operators will agree that the more pressure drop obtained **through** the producing formation, the more oil will be produced. This has been verified by laboratory results if time is eliminated. The time referred to would be geologic time and could have no significance in a practical water flood. The question then resolves itself into how much pressure can be applied at the input well and still confine the water to the producing formation?

Fig. 8 shows a composite injection pressure curve for the six wells in Flood No. 1. A break occurred at approximately 380 psi. All we know for sure is that the water was going into some new pore spaces when it reached that pressure. It is evident the threshold pressure (amount necessary to overcome capillary attraction) had been reached in all of the sand exposed. Therefore it is logical to assume that a break occurred, allowing the water to go through some formation other than the oil sand.

At the time these curves were taken, the plant pressure for Flood No. 1 was 750 psi. It had been raised from 500 psi. for only 1 month. When it was raised our oil production continued along the established decline curve but our water input and production increased almost 50 per cent. After the pressure was again dropped, our input and produced water dropped one-third but the oil production showed no signs of being affected.

The conclusion drawn was that any water injected above the breakthrough pressure did not result in increased oil production but caused an added expense in handling water. The pressure was reduced November 4, 1950, and it resulted in a saving of 475,000 bbl. of water being injected in Flood No. 1 from that time until March 15, 1951.

Fig. 9 shows water-flood production curves for Flood No. 1 and Flood No. 2. Note that a separate scale is used for each flood to keep them from overlapping. These are shown only to observe the difference in the shape occasioned by the different methods of operation. The smoothness of the curves is caused by the fact that water was started in all input wells at the same time.

Also observe the slope of the curve for Flood No. 1 between October 4 and November 4, 1950, during the time of operating with 750-psi. plant pressure.

It is suggested it is entirely possible to produce more oil by increasing the pressure above that required for a breakthrough. It is the opinion of the writer that if this is economically feasible, it should be done during the latter stages of the flood. This would eliminate the inherent danger involved and also would save the expense of handling large quantities of water during the early stages of the flood. It is also noted that as far as the writer knows, selective plugging has never proved successful when a breakthrough has occurred, if the plugging agent used is the type injected into normal sand pore spaces.

If pressures above normal are absolutely necessary in order to conduct a successful flood, it would then be necessary to break the formation down on purpose. These breaks could be plugged with cement if pressures were used during cementing injection well above those required to inject water. In other words, if a normal parting pressure were 500 psi. surface pressure and cement was introduced in the break at 1,500 psi. surface pressure, you could safely operate at 1,000 psi. without another breakthrough.

### Spacing and Pattern

Fig. 10 is shown merely to confirm the statement that any size lease with an even number of 10-acre locations can be incorporated in a floodable pattern without the necessity of unitization.

Fig. 11 is shown to point out that if an operator starts out with a 40-acre flooding pattern, it can be changed to a 20-acre pattern in order to protect lease boundaries.

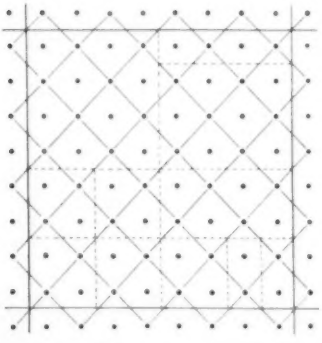


*Fig. 10—Water-flood pattern arrangement on 10-acre basis, resulting in equalized boundary conditions that do not necessitate unitization.*

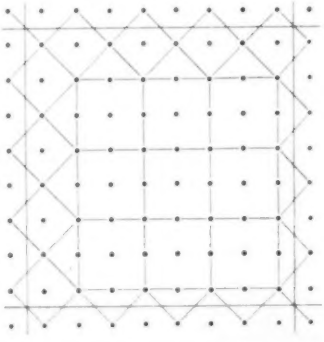


*Fig. 11—Illustration of an initial 40-acre flooding pattern that later can be readily changed to 20-acre pattern in order to protect lease boundaries.*

Here's a practical discussion of various methods including use of a new surface-active chemical, for the recovery of oil in a partly depleted sand, by

# SECONDARY OIL RECOVERY

**by J. H. Prusick***

IT should be evident that the amount of oil which may be recovered from a partly depleted sand by secondary methods, is dependent upon the amount of oil remaining in the sand. Of almost equal importance is the amount of water which will have to be injected in order to obtain a given amount of oil.

Observations in both the laboratory and the field have demonstrated that when a sand contains less than 20 per cent oil saturation, practically no oil will be recovered. It is therefore virtually impossible to obtain oil by known secondary methods from sands possessing a residual-oil content of 20 per cent or less of the effective pore space, and for this reason secondary-recovery methods have not been successful in some fields, even though the total oil content of the reservoir may amount to many thousands of barrels of oil per acre. As a practical matter, the recoverable oil may be estimated by subtracting the minimum saturation determined by laboratory tests from the total saturation, with necessary corrections which may affect the uniform displacement of the remaining oil. The higher the oil saturation of the sand, the larger the percentage of oil which can be recovered.

Displacement of the oil from the reservoir involves the disturbance of a state of equilibrium that exists between the interfacial tensions of four phases: gas, oil, water, and solid minerals; and the fluid with the greater adhesion tension with reference to the solid phase will tend to displace the fluid with the lesser adhesion tension. In most petroleum reservoirs it is believed that both oil-wet and water-wet surfaces exist, with the latter predominant except in a few fields. It is likely that completely hydrophobic (water-repelling) sands will not respond successfully to water flooding.

By the present methods of water flooding, 25 to 30 per cent of the oil remains in the sand at the abandonment stage of the flooding operation. Several cores have been taken from the Bradford, Pennsylvania, fields from areas which were water flooded, and it was found that the residual-oil saturation values after flooding were around 25 per cent. In Oklahoma cores have shown that residual-oil saturation, after flooding, range as high as 40 and 50 per cent.

The oil content of the various fields is checked by means of core samples. It was found that of the total porosity present in the reservoir, oil saturations of these porous voids may be anywhere from 40 to 80 per cent. The amount of this oil that will be recovered under primary conditions will be dependent upon the pressure, permeability, and control of production. Usually on the average of from 30 to 40 per cent of the oil present will be taken out by primary means. In calculating it can be seen that 30 per cent of the total of 80 per cent of reservoir oil in place will leave behind 56 per cent of the oil. By resorting to a water-flooding operation, the field will produce (taking everything into account) until there is a residual oil content in the sand of from 20 to 25 per cent. This means that an additional 28 to 36 per cent of oil can be recovered by means of secondary water flooding.

The present claim is, that it is practically impossible to recover this 20 to 25 per cent oil left in the reservoir by using the present methods. In some fields, such as in Oklahoma, residual-oil saturations are as high as 40 to 50 per cent, which are unrecoverable by further water flooding.

### Surface Active Chemicals

It is theoretically possible to sweep more oil out of the sand by using surface-active chemicals to lower the surface tension of the water, the interfacial tension between the oil and water, and between the sand which is holding the oil. If this can be done successfully, the recovery of oil by secondary water-flooding can be increased even more. This fact has been known for some time and many patents have been received based on some novel idea of utilizing a chemical for increasing the recovery of oil, but none has been proved successful to date. The economic factor is always present and this is because the chemicals that have been tried were lost by being adsorbed onto the sand. In tests that have been tried by others, extremely low concentrations of the chemical were used. This is probably one of the reasons most of the tests failed.

Recently a new Armour fatty-acid derivative, "Ethomid HT/60" (hydrogenated tallow amide condensed with 50 mols of ethylene oxide) has been tested, and found to be a potentially useful surface-active agent for increasing the recovery of crude oil. Laboratory tests have shown that Ethomid HT/60 at a concentration of 5 p.p.m. gave an interfacial tension between Bradford-produced water and Bradford crude oil, of 16 dynes per centimeter, as against the 35 dynes per centimeter obtained on the control.

It was also found that by keeping a 5-p.p.m. concentration of the product in contact with sand for a period of 6 days, there was no change in surface-tension reading. This indicated that the Ethomid HT/60 was not lost by adsorption. Other surface-active agents were checked by this test and it was found that they were lost quite rapidly by adsorbing onto the sand surface.

A recent laboratory test by a California producing company proved that in their flooding tests on large cores they were able to reduce the oil content of a core to a residual oil content of 10 per cent by flooding with a 10-p.p.m. concentration of Ethomid HT/60 in water solution. They are now in the field using this method on two different pilot floods.

A field test was started in the Bradford area, in which 1,500 lb. of Ethomid HT/60 was injected as a 3.3 per cent water solution during a period of 14.5 hours. This high concentration of wetting agent should have had initially strong wetting and detergency effects on the oil in place. It was theorized that it might be possible to build up an oil bank, which could be moved toward the producing wells by the followup injection water. Considering the tightness of the producing formation it was assumed that it would take perhaps 6 months before any conclusions could be drawn. Although final reports have not been received at this time, it was found that there was an initial increase in oil production, and in water intake rates, 4 months after the treatment.

**Bradford test details.**—One-hundred-and-twenty-six days prior to the injection of Ethomid HT/60, a tracer test was made in this field with fluorescein dye. This dye

*Research division, chemicals and by-products department, Armour & Co. Presented at Second Oil Recovery Conference, A. & M. College of Texas, College Station.

# What they say!

**(In this case "they" are Helicoid Gage users)**

"We use your Helicoid Gages in very severe pulsation work and have found them very satisfactory."

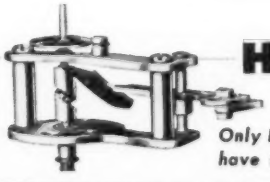
"A Helicoid Gage operating under the worst conditions for 4,000 hours is still functioning, although other gages have been worn out."

". . . no other gage has come close to giving such long life and accuracy as the Helicoid."

"Your Helicoid Gages have been used in our plant for more than five years and have proved their superiority over competitive makes."

"We have six gas engines equipped with Helicoid Gages on the oiling system, subject to more vibration than any rack and pinion gage will stand."

***All quotes are taken from letters in our files. Write today for HELICOID GAGE catalog.***



**HELICOID**

*Only Helicoid Pressure Gages have the Helicoid Movement*

**ACCO**

HELICOID GAGE DIVISION
AMERICAN CHAIN & CABLE COMPANY, INC.
Bridgeport 2, Connecticut


was injected into the formation through one water-injection well, and the produced water of four producing wells was checked for the fluorescein tracer. Due to close spacing and high intake rate it was deemed advisable to take samples every day. The fluorescein showed up in the produced water of one well 23 days after injection. It continued to show up for a total of 53 days. However, the fluorescein never showed up in the other three wells which were being sampled.

After the injection of the Ethomid HT/60, it was found from the daily water samples taken that fluorescein was again detected in the water of the same well in which it was found in the previous test. This was observed 5 days after the Ethomid HT/60 injection. Further, the fluorescein showed up in the produced water of a second well 12 days after the HT/60 injection, where it had not appeared before in the previous tracer test. The fluorescein was detected in concentrations strong enough to be visible to the naked eye and continued to be detected for 43 days at the first well and 38 days at the second well. This indicates desorption of the fluorescein from the reservoir system by the wetting action of the Ethomid HT/60.[3]

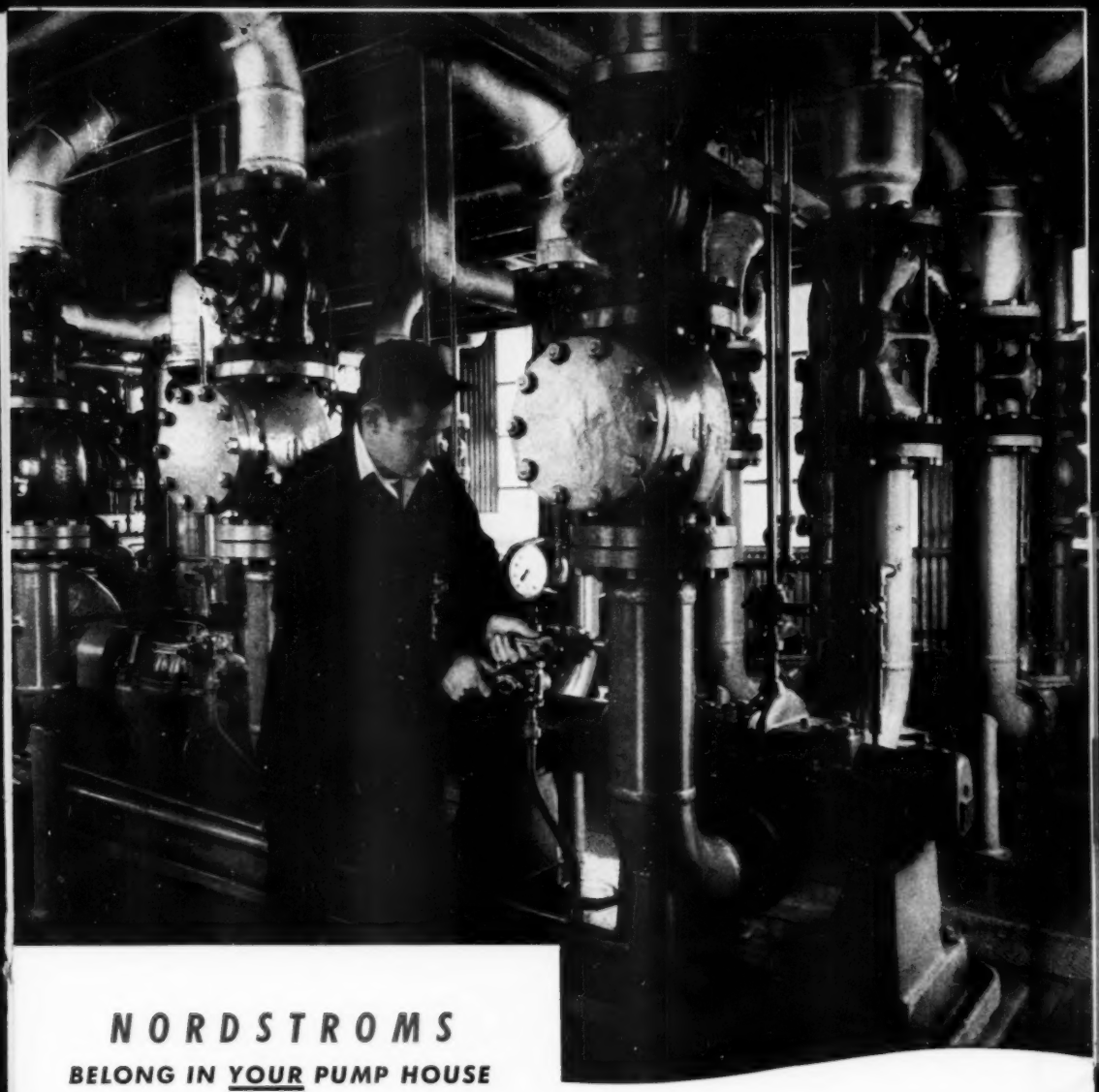
Surface-tension studies made on samples of the produced waters showed that the Ethomid HT/60 was coming through. The speed with which the injected water showed up at the producing well indicated that there were highly permeable streaks, and perhaps cracks or fissures in the reservoir rock through which the water moved at an accelerated pace because of its lowered viscosity and surface tension. Complete data are not assembled at this time, so that a final statement on this test is not possible.

There are other possible injection techniques for the use of Ethomid HT/60. In addition to the single "slugging" operation discussed above, it may be found that intermittent slugging with a 1 per cent concentration injected every 2 weeks for a period of 6 weeks may give better results. This type of treatment would subject the producing formation to a new strong wetting action each time, which would further upset the interfacial tension relationships between the various phases present within the reservoir.

Another method is the continuous injection of Ethomid HT/60 at a concentration of 10 to 50 p.p.m. Although the 10-p.p.m. treatment may give the desired results, it is wiser to plan a safety factor against partial adsorption by increasing the concentrations of Ethomid HT/60 to perhaps 50 p.p.m. At this rate the cost of chemical would still be substantially below the calculated cost limit set per barrel of injected water.

### Increased Water Injection

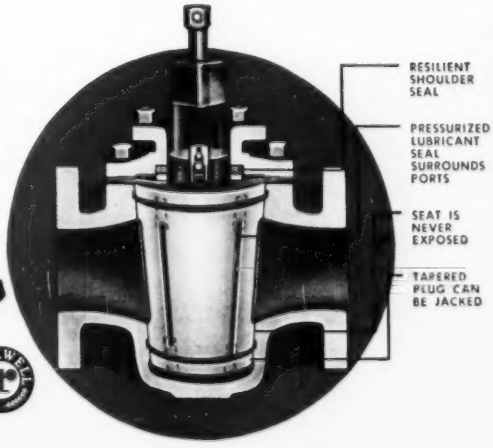
Another possibility of increasing the recovery of oil in a secondary-recovery operation, is to increase the amount of water injected without resorting to higher pressures. It has been established, by several tests in the eastern fields, that water-injection rates were definitely increased when acid water were usd. This technique could be followed in reservoirs containing clays which tend to flocculate and swell on contact with water. Theoretically the disruption of cementing clays may cause irregularities in injection rates. The clay material, if changed physically, can hinder the



## NORDSTROMS

**BELONG IN YOUR PUMP HOUSE**

Insure most dependable operation in controlling flow of all liquids, chemicals, gases, hydrocarbons, slurries and solutions—hot or cold—at any pressure



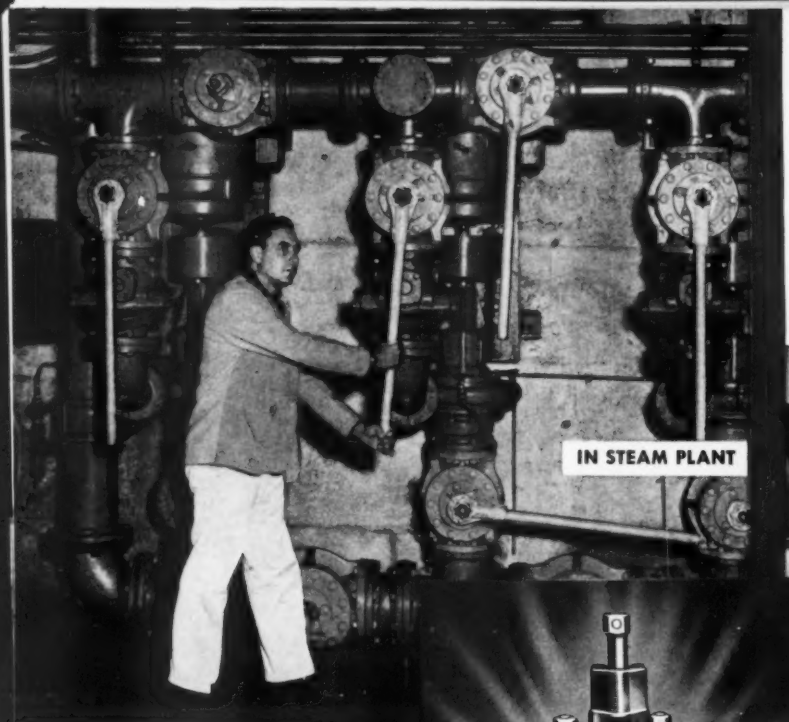

**Nordstrom**

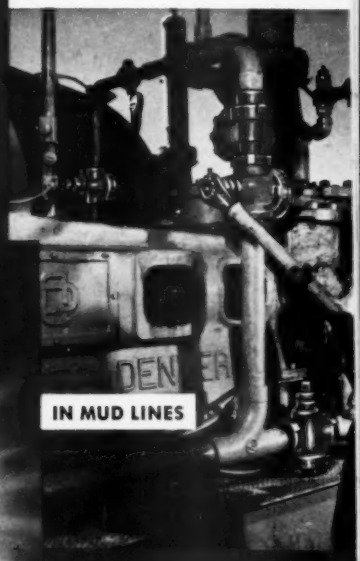
**VALVES... NOW AUTOMATICALLY LUBRICATED**

WITH Trade Mark **Hypermatic** Pats. Applied for

ROCKWELL

# NORDSTROMS
## —*the choice for difficult services*



**ROCKWELL**

**MANUFACTURING COMPANY**

**400 North Lexington Avenue, Pittsburgh 8, Pa.**

Atlanta, Boston, Chicago, Columbus, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa . . . and leading Supply Houses. Export: International Division, Rockwell Manufacturing Company, 7701 Empire State Building, New York 1, N. Y.

flow of water. According to tests made on Allen sand samples, the clay materials were unaffected by low pH waters. This can be clearly demonstrated by simple observation of sand samples in contact with the different waters.

**Corrosion control.**—The use of low-pH waters may be of considerable value, but it presents another factor which must be controlled. This factor is corrosion to pipes and equipment brought on by the acid waters. Acid corrosion can be esaily controlled by using such Armour chemical as Arquad 2C and Armac C, in concentrations as low as 5 to 10 p.p.m

Arquad 2C is the dicocodimethylammonium chloride, sold commercially as a 60 or 75 per cent active material in isopropyl alcohol. Arquad 2C is a strong cationic chemical. Due to its highly polar properties it films over metal surfaces, thus giving protection against the corrosive action of brine and acid waters. It has been found by many tests that it inhibits corrosion induced by hydrogen sulfide. Arquad 2C has been used successfully as a corrosion inhibitor in secondary water-flooding operations as well as in primary-producing oil wells.

Water-flooding and brine-disposal operations are invariably plagued by the growth of troublesome bacteria and algae. Arquad 2C has been proved to be a powerful bactericide at concentrations as low as 5-10 p.p.m With proper application and use, Arquad 2C can effectively and economically control organic growth.

Arquad 2C will, of necessity, be found to be a useful agent to control corrosion and inhibit bacterial and algae growth in treating the waters used in secondary-recovery operations, brine-disposal operations, field-repressuring operations, crude-oil pipe lines, and industrial water-cooling operations.[2]

### References


1. P. W. Sturm and W. E. Johnson, "Field Experiments With Chemical Tracers in Flood Waters," Producers Monthly, December 1950, pp. 11-17.
2. V. P. Gregory, C. R. Groninger, J. H. Prusick, "Chemical Treatment of Flood Waters Used in Secondary Oil Recovery," Producers Monthly, May 1950, pp. 27-31.


**TABLE 3—BENZENE-TOLUENE PRODUCTION BY PLATFORMING $C_6$ AND $C_7$ FRACTION OF NATURAL GASOLINE**
(Yields and Properties)

| | Debut. nat gaso. react. $C_7$ e.p. chg. (vol. %) | Reactor charge (vol. %) | $C_7$ e.p. Platformate (vol. %) | Total blended gaso. after benzene-toluene extraction $C_7$ e.p. (vol. %) |
|---|---|---|---|---|
| i-Pentane | 23.5 | | 0.3 | 23.8 |
| n-Pentane | 21.2 | | 0.1 | 21.3 |
| $C_6$-150° F. fraction | 10.8 | | 5.4 | 16.2 |
| 150°-220° F. fraction | 32.1 | 32.1 | 10.9 | 10.9 |
| $C_7$ e.p. fraction | 12.4 | | | 12.4 |
| Benzene | | | 5.5 | |
| Toluene | | | 5.9 | |
| | 100.0 | 32.1 | 28.1 | 84.6 |
| Gas production, standard cu. ft. per bbl. reactor charge | | | | 1,235 |
| Net heating value, B.t.u. per standard cu. ft. | | | | 530 |
| Inspection data: | | | | |
| A.P.I. | 75.0 | | | |
| R.v.p. | 9.9 | | | |
| Molecular weight | 82.0 | | | |
| Octane numbers: | | | | |
| Research (F-1), clear | 68.0 | 65.5 | | 68.9 |
| +3 cc. TEL | 86.5 | 83.5 | | 86.5 |

**TABLE 4—PROFITABILITY OF BENZENE PRODUCTION BY PLATFORMING A LIGHT NATURAL GASOLINE**
(5,700 bbl. per stream day of debutanized light natural gasoline, 1,000 bbl. per stream day of Platformer feed)

| | | Dollars per oper. day |
|---|---|---|
| Credits: | | |
| 5,260 bbl. per stream day, 10-lb. R.v.p. blending stock at 11.0 cents per gallon* (2.4 cc. per gallon TEL) | | $24,301.20 |
| 300 bbl. per stream day benzene at 45 cents per gallon | | 5,670.00 |
| Fuel-gas make—27.3 × $10^6$ B.t.u. per hour at 11 cents per M.M.-B.t.u. | | 72.00 |
| | | $30,043.20 |
| Debits: | | |
| 5,700 bbl. per stream day debutanized light natural gasoline at 10.30 cents per gallon† (unleaded) | | $24,658.20 |
| Direct operating costs for Platforming: | | |
| Supervision—est. at 25 per cent of labor | $24.00 | |
| Operating labor—2 men per shift at $2.00 per hour | 96.00 | |
| Catalyst—12.5 cents per barrel reactor feed | 125.00 | |
| Maintenance—estimated | 90.00 | |
| Royalty—1,000 bbl. per stream day at 7 cents per barrel + 1.0 cent per gallon benzene | 196.00 | |
| Taxes and insurance—estimated at 2.5 per cent | 73.00 | |
| Interest on average balance at 4.0 per cent | 70.00 | |
| Solvent for extraction—estimated | 18.00 | |
| Utilities: | | |
| Fuel—20.5 × $10^6$ B.t.u. per hour at 11 cents per M.M.-B.t.u. | 54.12 | |
| Water—770 g.p.m. at 1 cent per 1,000 gallons | 11.09 | |
| Steam—2,400 lb. per hour at 25 cents per 1,000 lb. | 14.40 | |
| Power—130 kw. at 1 cent per kw.-hr. | 31.20 | 802.31 |
| TEL costs at 0.25 cent per cc.—5,260 × 42 × 2.4 × 0.0025 | | 1,325.52 |
| | | $26,786.53 |
| Net profit before depreciation | | $3,256.67 |
| Platformer 675,000 | | |
| Extraction 335,000 | | |
| Payout time on $1,010,000 investment | | 0.9 years |

*Average of lows for 86 research octane gasoline for Gulf Coast—cargoes, domestic and export, all ports for National Petroleum News for 1951.
†Average of lows for 82 research octane gasoline after deducting cost of TEL (2.8 cc. per gallon).

# Aromatics Production By Platforming

*(Continued from page 88)*

depreciation on a large percentage of the new equipment. It is further reported that an arrangement is being made with the plant operators and producers whereby a percentage of the net cash proceeds, after depreciation and operating expenses, are passed back to the plant owners and producers.

Under the proposed arrangements of the processing company the volume of material gathered is reported to be between 10,000 and 12,000 bbl. daily. The benzene fraction is being extracted both from the natural gasoline and from the plant formate. While the Platforming operation, as discussed herein, can be installed economically in volumes of some 3,500 bbl. daily, it would appear that a volume of from 8,000 to 12,000 bbl. would be required for economic benzene extraction in addition to Platforming. It well may be that the pattern is being set whereby a future trend of the industry may be foreshadowed and that the natural-gasoline materials that have endured the hardships of many severe economic setbacks will come into their own, thus lending a stabilizing effect not only to the gas industry but will no longer be a thorn in the side of the crude petroleum refiner.

It is believed that additional Platforming installations and possible benzene and chemical plants will be installed in the near future, either on plants having sufficiently large volumes to justify the economics of the equipment installation, or by a combination of several plants pooling their raw materials for such processing installations.

# Combustion Gas Turbine—Important New Prime Mover for the Gas Pipe-Line Industry

## Here are design and engineering evaluation data

by J. L. Oberseider*

FROM now on business decisions with respect to additions and replacements of prime movers for gas compressors should be based on economy studies that include the combustion gas turbine as an alternative. Units with rated capacities from 1,850 to 6,500 hp. are, or soon will be, available.

### Capital Investment

The fixed capital, that is, the installed cost of a gas-turbine-driven centrifugal compressor, plus the working capital, or cash which must be reserved for the payment of operating expenses, represents the capital investment required. Delivered and installed costs, exclusive of land, or gas - turbine - driven centrifugal compressor units are given in Figs. 1 and 2.

Land requirements are so small that the cost is within the limits of accuracy of preliminary cost estimates. A typical station, consisting of two 5,000-hp. gas-turbine-driven centrifugal compressors, occupies a building approximately 48 by 64 ft. and a total area of about 3,100 sq. ft. Working capital requirements should be about 1.75 per cent of the fixed capital investment.

*Southern California Gas Co. Portion of paper presented at Pacific Coast Gas Association, Transmission Conference, Bakersfield, Calif.

### Annual Costs

The annual costs of operating combustion gas - turbine - driven centrifugal compressors have been segregated into fixed costs and operating and maintenance expenses for the purpose of preparing estimates. These estimates are shown graphically in Figs. 3 and 4. They are based on the literature, private communications, and accounting practice.

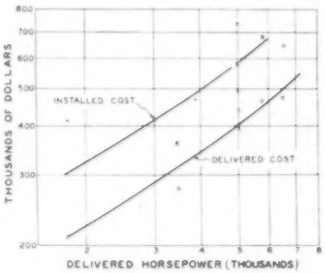



*Fig. 1—The delivered and the installed cost of combustion-gas-turbine-driven centrifugal compressors without regenerator.*

A 97 per cent availability, that is, 8,500 operating hours out of 8,760 per year, has been assumed on the basis of the two combustion gas-turbine installations in this country that have operated from 7 to 13 months.

**Fixed costs.**—This portion of the actual costs break down into:

1. Depreciation—straight-line method using zero salvage value and manu-

*(Continued on page 104)*

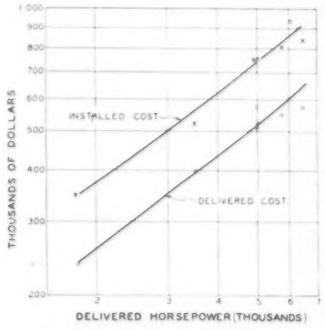



*Fig. 2—The delivered and the installed cost of combustion-gas-turbine-driven centrifugal compressors with regenerator.*

**TABLE 1—DESIGN SURVEY OF COMBUSTION GAS TURBINES**

| | Allis-Chalmers Mfg. Co. | Brown Boveri Corp. | | Clark Bros. Co., Inc. | | General Electric | | Westinghouse Electric Corp. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Manufacturer— | | | | | | | | | | |
| General characteristics: | R | NR | R | NR | R | NR | R | NR | NR | NR |
| Rated capacity, hp. | 3,500 | 5,100 kw. | 4,700 kw. | 5,500 | 5,500 | 5,000 | 5,000 | 1,850 | 5,000 | 6,500 |
| Speed, r.p.m. | 5,180 | | | 7,000 | 7,000 | 5,000 | 5,000 | 8,750 | 5,000 | 5,000 |
| Altitude, ft. | | | | 14.2 psia. | 14.2 psia. | 1,000 | 1,000 | | 1,000 | 1,000 |
| Ambient temperature, °F. | | 68 | 68 | 60 | 60 | 80 | 80 | 80 | 80 | 80 |
| Performance: | | | | | | | | | | |
| Thermal efficiency, %, based on L.H.V. of fuel | 30 | 19 | 24 | 20 | 25 | 17 | 25 | 16 | 20 | 21 |
| L.H.V. of fuel | | | | | 1,029 | 1,020 | 1,020 | 1,000 | | |
| Turbine: | | | | | | | | | | |
| Inlet temperature, °F. | 1,500 | 1,100 | 1,100 | 1,400 | 1,400 | 1,450 | 1,450 | 700 to 1,350 | 1,350 | 1,350 |
| Stack temperature, °F. | | | | | | | 566 | | | |
| Number of shafts | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Shaft speeds, r.p.m.: | | | | | | | | | | |
| Air compressor | 5,180 | | | | | 6,700 | 6,700 | 8,750 | 5,000 | 5,000 |
| Gas compressor | 5,180 | | | 7,000 | 7,000 | 2,000-5,500 | 2,000-5,500 | 8,750 | 5,000 | 5,000 |
| Number of turbine cylinders | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Number of turbine cylinders in series | 0 | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Combustor type | Double (2 in parallel) | Single | Single | Single reverse flow | Single reverse flow | Multiple (6 in parallel) | Multiple (6 in parallel) | Multiple (12 in parallel) | | Multiple (6 in parallel) |
| Regenerator: | | | | | | | | | | |
| Efficiency, % | 60 | 75 | 75 | | 75 | | | | | |
| Air discharge temperature, °F. | | | | | | | 800 | | | |
| Air compressor: | | | | | | | | | | |
| Type | axial | axial | axial | axial | axial | axial | axial | axial | axial | axial |
| Number of stages | 20 | | | 10 | 10 | 14 | 14 | | 16 | 16 |
| Discharge pressure, psig. | 44 | | | | | 70 | 70 | 5 to 60 | 75 | 75 |
| Compression ratio | 4 | | | | | | | | | 6 |
| Compression efficiency, % | 85+ | | | | | | | | | |

R—Regenerator. NR—No regenerator.

# Semiportable Automatic Gas Compressor Station Helps Pipe-Line Capacity at Peak Loads

## Electric-motor-driven units are mounted on steel skids

by **Ralph S. Nabors***

IN the past 2 years, Pacific Gas & Electric Co. has constructed several automatic compressor stations to support the gas-system capacity during peak loads when normal line capacities are inadequate, at available pressures, to meet these demands. The compressor plant described here is the semiportable unit at Hollister, Calif. This installation was completed early in 1950 and has since been used, as needed to bolster the load requirements for the Salinas-Monterey area.

This station consists mainly of two 800-hp. electric-motor-driven 12 by 10½ compressor units. The total capacity of the plant is approximately 36 million cubic feet daily at 165 psig. inlet pressure and 365 psig. discharge pressure, at 60° F. and 30-in. mercury.

Incoming gas is passed through a conventional air-bath scrubber, then compressed, and afterward cooled by passing through a forced-draft waterless cooler, (Fig. 1). A small section of the cooler is used for removing heat from the jacket water.

The motor, compressor, oil and water pumps, and the electrical operating mechanism and the intake and discharge headers are skid mounted, on steel. After the concrete foundation mat was poured, the packaged unit was moved from the shop to the job site and set in place. (See Fig. 2).

*Pacific Gas & Electric Co. Portion of paper presented at Pacific Coast Gas Association Transmission Conference, Bakersfield, Calif.

### Automatic Features

The fully automatic features of the plant are the principal way in which it deviates from the conventional compressor station. The units may be set to operate singly or in parallel. When pressure on the intake to the compressor drops to a predetermined minimum the units start. At suction pressure above this minimum, it is not necessary to operate the plant and gas will flow through the check valve installed between intake and discharge headers. This setting may be changed to suit conditions of load and pressure requirements.

A three-way switch in the instrument air-supply line to the snap-acting pilots on the intake compressor valves insures that the unit is started without load. When the d.c. field is applied, the pressure controller will supervise the loading of the valves as required to meet output requirements.

As the pressure starting switch closes, 115-volt current is applied to two relays which are connected in parallel, each closing a contact. This starts motors on the blower, cooling tower fans, water pump, oil-circulat-

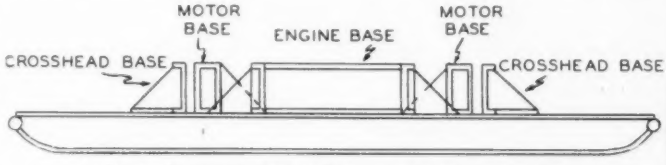



*Fig. 2—Arrangement of steel skid mounting for compressor unit.*

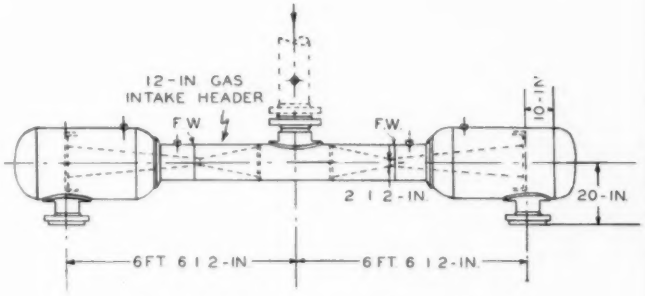



*Fig. 3—General scheme of gas-intake pulsation pots.*

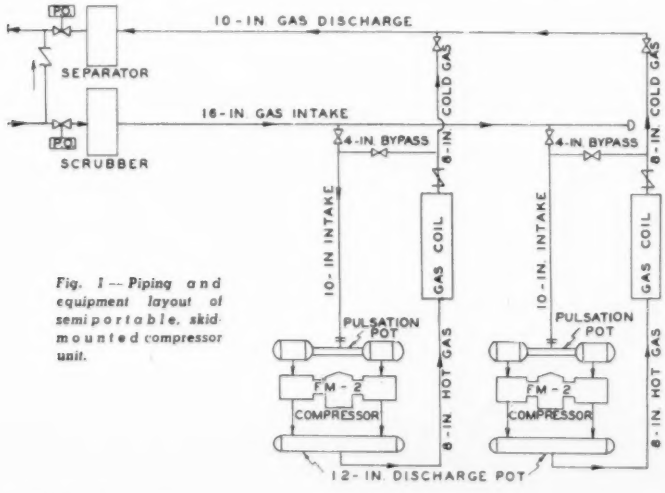



*Fig. 1—Piping and equipment layout of semiportable, skid-mounted compressor unit.*

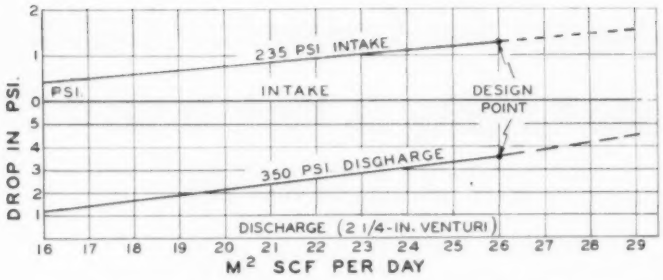



*Fig. 4—Curve for determining pressure drop in venturi dampeners.*

ing pump, and lubricator pump. After a 3 to 5-minute warmup period, a final series relay closes completing the circuit to start the main motor and the exciter motor. Breaking the circuit on any of the auxiliary motors or failure of air supply will shut down the main motor. Pilot lights are installed to indicate cause of shutdown. This plant has two houses and a pipe-line office located on the property and signal bells are wired to both the cottages and the office to give immediate notification of a plant failure.

### Operation Experiences

The unit, except for minor exceptions, operated satisfactorily from the start. After the initial adjustments and minor changes were made, one major problem, requiring remedial measures, was evident. That problem was abnormal vibration resulting from putting the two compressors in operation. Vibration existed in the intake piping and even included the intake dust scrubber. At certain steps in unloading this vibration was very severe. The discharge piping was also subjected to severe vibration, including the headers and the gas-cooling towers.

Experimentation revealed that an orifice placed in the incoming and discharge lines was effective in alleviating pulsation. To avoid large pressure drops caused by insertion of the orifices, it was decided to use venturi tubes and to install expansion bottles between the venturi and intake valve. (See Fig. 3). A venturi tube was also installed in the discharge line close to the cylinder. These changes, plus a change in the sequence of unloading, were effective in materially lessening vibration. Pressure drop tests were run on a 26-million cubic foot per day load on a single unit. About 235 psi. intake pressure is required to handle this amount. The maximum discharge was 350 psig. Data obtained under these conditions are plotted in Fig. 4.

The plant is operated unattended except for a short period each morning when an employe visits the station for routine check and replenishment of lubrication oil, jacket water, and scrubber oil as required. This routine includes checking before and after cooling temperature of the gas, lubricating oil pressure and temperature, checking of all lubricators for operation. Filling is not required as these lubricators are kept constantly at a full level with oil pumped from the crankcase sump.

## Combustion Gas Turbine

*(Continued from page 102)*

facturer's estimated lives which vary from 12 to 25 years.

2. Insurance—$0.224 per $100 of insurable property for 3 years.

3. Property taxes—$6.53 per $100 of assessment and the assessed valuation as 35 per cent of the actual value.

4. Return on investment—6.25 per cent of the capital investment.

5. Federal income tax—46/54 times the return on the investment.

6. State franchise tax—4/96 times the sum of the return on the investment and the federal income tax.

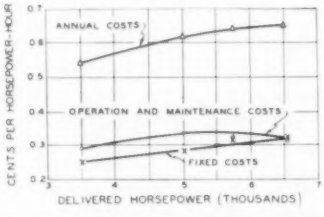



*Fig. 3—Annual cost of operation of combustion-gas-turbine-driven centrifugal compressors without regenerator.*

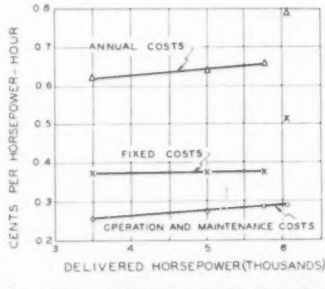



*Fig. 4—Annual cost of operation of combustion-gas-turbine-driven centrifugal compressors with regenerator.*

**Operating and maintenance expenses.**—These are separated into items:

1. Operating labor—$2 per hour. Manufacturers' estimate from one to two men per shift.

2. Supervision—10 per cent of operating labor or the manufacturers' estimate.

3. Payroll charges—12.9 per cent of operating labor plus supervision.

4. Maintenance labor and supplies and expenses—manufacturers' estimates vary from 1 to 5 per cent of fixed capital, the former figure being for an actual installation over a 13-month period.

5. Fuel—15 cents per M.c.f. and over-all thermal efficiencies from 16 to 30 per cent.

### Engineering Evaluation Data

A survey of actual and estimated requirements for installing gas-turbine-driven centrifugal compressor units has provided much useful information.

**Site preparation.**—Three dollars per horsepower seems to be a satisfactory estimate for this item.

**Foundations.**—A cost of about $1.40 per horsepower is indicated here.

**Piping.**—Ten dollars per horsepower appears to be a fair estimate for this item.

**Building.**—A unit cost of $6 per horsepower has been developed on the basis of a requirement of 12 cu. ft. per horsepower at $0.50 per cu. ft.

### Bid Requests

If the results of the engineering economy study indicate that bids should be obtained from manufacturers of gas turbines, following information should be included in the inquiry.

**Information relative to turbine.**—Here is included:

1. Ambient air temperature for periods of operation under consideration.

2. Altitude of station.

3. Availability, if any, of water:
   (a) Temperature.
   (b) Amount.

4. Availability, if any, of electrical power:
   (a) Voltage conditions.

5. L.H.V. (lower heating value) of gas for fuel. (May be determined from a gas analysis.)

**Information relative to compressor.** This covers:

1. Station inlet and discharge pressure.

2. Station inlet gas temperature.

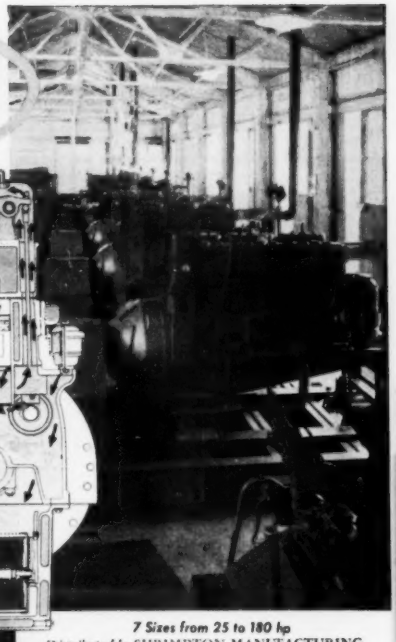
3. Specific gravity of gas.

4. Station flow variation (state standard conditions):
   (a) Inlet pressure variation assuming constant discharge pressure or pattern desired.

5. Isentropic exponent of compression. (May be determined from a gas analysis.)

MINNEAPOLIS MOLINE
MM
MODERN MACHINERY

# OILFIELD POWER
## WITH HEAT EXCHANGER BASE PAN!



MM HEAT EXCHANGER BASE PAN maintains uniform operating temperature from top to bottom of the engine regardless of load or atmospheric temperature. This results in a sludge-free engine . . . best oil filtering . . . greatly extended periods between servicing . . . far fewer oil changes . . . and greatly prolonged engine life.

HERE'S HOW IT WORKS: The base pan is cast with water jackets just like the cylinder blocks and heads. A heavy-duty by-pass thermostat diverts the water from the outlet manifold through the base pan jacket and back through the pump and engine. Circulating the hot water around the oil in the pan eliminates outside radiation and maintains 165-180° temperature for ideal lubrication and filtering.

*Positive Vacuum Crankcase Ventilation* draws 2 to 3 cu. ft. of fresh air per minute through a metering valve. After mixing with oil-contaminating gases, raw and burned, it is withdrawn through the cylinder head covers and into the intake manifold. Investigate MM Oil Field Power . . . the engine with lower field service cost.

**MINNEAPOLIS-MOLINE**
MINNEAPOLIS 1, MINNESOTA

*7 Sizes from 25 to 180 hp*
*Distributed by* SHRIMPTON MANUFACTURING AND SUPPLY CO. . . . Los Angeles, California; Oklahoma City, Oklahoma; Kilgore, Texas

*Preventive Maintenance Is Essential Today!*

## CONTROL SCALE and CORROSION
### *in ENGINE JACKETS, COMPRESSORS, COOLING TOWERS — Wherever Water Is Used*

Now, more than ever before, it is necessary to increase the efficiency and life of equipment by maintaining scale-and-corrosion-free water-side surfaces. Wright Chemical Engineers can solve your water-conditioning problems quickly and economically.

Wright CHEMICALS
**WRIGHT CHEMICAL CORPORATION**
*Specializing in Water Conditioning*
GENERAL OFFICES AND LABORATORY:
615 West Lake Street, Chicago 6, Illinois
*Offices in Principal Cities*
Sole Distributor of Nelson Chemical Proportioning Pumps

# QUESTIONS on TECHNOLOGY

**by W. L. Nelson**
Consulting Engineer

## Catalytic Cracking Capacity

**What have the thermal and catalytic cracking capacities been? What is the trend? R.F.P.**

The crude capacity (operating) of the United States is shown in Table 1. Approximate cracking capacity, both thermal and catalytic, are shown as percentages of the crude capacity. The cracking capacities are based on barrels of charge stock. Average yields of gasoline by cracking cannot be stated accurately but in general, catalytic yields grew from about 29 per cent in 1941 to about 42 per cent in 1951, and thermal yields have stayed almost constant ranging from about 48 per cent in 1941 down to about 47 per cent in 1951.

Decreases in the percentage of cracking capacity (particularly total and thermal) does not usually mean that plants are being abandoned. It usually means that crude capacity has grown faster than cracking capacity could be installed. This applies particularly for the years 1942-1945. More representative conditions are represented by the years 1934-1938 and 1949-1951, which indicate that the total cracking capacity needs to be about 60 per cent of the crude capacity.

Catalytic capacity has been increasing because it fulfills several needs. It produces less residual fuel oil, it produces more of the middle-distillate fuel oils, and it permits higher-octane-number gasoline. However, catalytic cracking will not completely replace thermal cracking because residual cracking stocks can be handled only by the thermal processes. A study of this situation was presented on this page in the October 17, 1950, issue, "Future of Thermal and Catalytic Cracking" (p. 125). This study indicates that about half of all cracking will be done catalytically unless entirely new influences arise. One such factor might be the widespread use of catalytic processes for the reforming of straightrun gasolines. At least 15,000 bbl. per day of platinum catalyst reforming units will be in operation during 1951, and these or similar processes might in the future contribute significantly to the total catalytic capacity.

In summary, catalytic cracking capacity will increase somewhat with respect to thermal capacity, catalytic reforming capacity will increase sharply although it may not become a large part of the total capacity, and thermal capacity will change little. New thermal capacity will not be installed except to care for additional crude capacity or as employed in preparing catalytic cracking charge stock (viscosity breaking, delayed coking, or coking). Should it become necessary to process lower-gravity crude oils, such as an average gravity of 21° A.P.I., thermal capacity would increase until it constituted about 60 per cent of the total cracking capacity.

TABLE 1—APPROXIMATE CRUDE AND CRACKING CAPACITY OF THE U. S. REFINING INDUSTRY

| Year— | Crude, B.P.D. (operating) | Cracking capacity, % of crude oil | | |
|---|---|---|---|---|
| | | Thermal | Catalytic | Total |
| 1918 | 1,186,000 | | | |
| 1920 | 1,531,000 | | | |
| 1922 | 1,855,000 | | | |
| 1924 | 2,481,000 | | | |
| 1926 | 2,562,000 | 38.3 | | 38.3 |
| 1928 | 3,036,000 | 43.7 | | 43.7 |
| 1930 | 3,635,000 | 47.0 | | 47.0 |
| 1932 | 3,625,000 | 56.5 | | 56.5 |
| 1934 | 3,554,000 | 60.5 | | 60.5 |
| 1936 | 3,750,000 | 59.8 | | 59.8 |
| 1938 | 3,970,000 | 55.0 | 3.6 | 58.6 |
| 1940 | 4,197,000 | 47.8 | 4.7 | 52.5 |
| 1941 | 4,180,000 | 49.8 | 4.7 | 54.5 |
| 1942 | 4,497,000 | 48.1 | 4.5 | 52.6 |
| 1943 | 4,409,000 | 51.0 | 4.3 | 55.3 |
| 1944 | 4,709,000 | 43.5 | 9.7 | 53.2 |
| 1945 | 5,078,000 | 39.6 | 16.6 | 56.2 |
| 1946 | 5,086,000 | 45.8 | 18.2 | 64.0 |
| 1947 | 5,336,000 | 44.0 | 18.9 | 62.9 |
| 1948 | 5,825,000 | 43.7 | 20.6 | 64.3 |
| 1949 | 6,346,000 | 37.2 | 22.6 | 59.8 |
| 1950 | 6,572,000 | 34.9 | 26.6 | 61.5 |
| 1951 | 7,032,000 | 33.2 | 26.8 | 60.0 |

## Chemistry—Nonbenzenoid Hydrocarbons

**Can you suggest chemistry books that pertain to petroleum? J.E.B.**

The chemistry of petroleum hydrocarbons is so complex that most literature pertains to technology rather than the pure science of chemistry. In addition, the purely chemical approach is of usefulness and hence is not confined to any branch of application such as the petroleum industry. However, the following books are sufficiently devoted to pure science to warrant consideration of them as chemistry books even though they pertain primarily to petroleum.

Brooks, B. T., The Chemistry of the Nonbenzenoid Hydrocarbons, second edition, 1950, Reinhold Publishing Corp., New York.

Burk and Thompson, Polymerization and its Application, 1938, Reinhold Publishing Corp., New York.

Dunstan, et al., The Science of Petroleum, five volumes, 1938 and 1950, Oxford University Press, London.

Egloff, G., Reactions of Pure Hydrocarbons, 1937, Reinhold Publishing Corp., New York.

Egloff and Hulla, Alkylation of Alkanes, Vol. I, 1948, Reinhold Publishing Corp., New York.

Egloff, Hulla and Komarewsky, Isomerization of Pure Hydrocarbons, 1942, Reinhold Publishing Corp., New York.

Ellis, Carleton, The Chemistry of Petroleum Derivatives, Vol. II, Reinhold Publishing Corp., New York.

Goldstein, R. F., The Petroleum Chemicals Industry, 1949, E. & F. N. Spon, Ltd., London.

Gruse and Stevens, Chemical Technology of Petroleum, second edition, 1942, McGraw-Hill Book Co., New York.

Gurwitsch, L. (H. Moore), The Scientific Principles of Petroleum Technology, new edition, 1932, D. Van Nostrand Co., New York.

Ipatieff, V. N., Catalytic Reactions at High Pressures and Temperatures, 1936, Macmillan Co., New York.

Kalichevsky, V. A., Modern Methods of Refining Lubricating Oils, 1937, Reinhold Publishing Corp., New York.

Kalichevsky and Stagner, Chemical Refining of Petroleum, second edition, 1942, Reinhold Publishing Corp., New York.

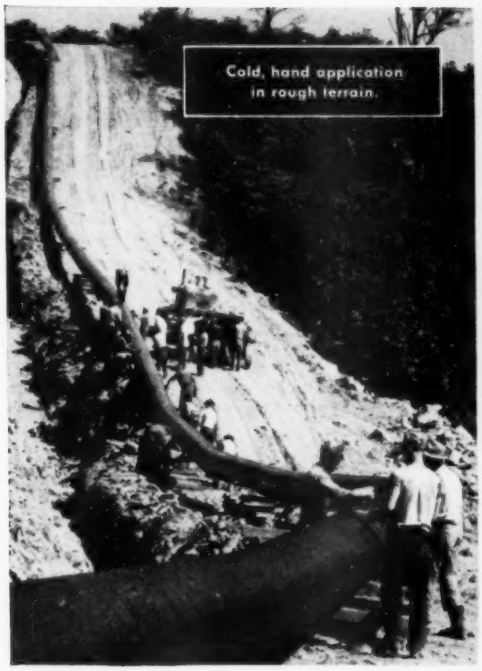
Sachanen, A. N., Conversion of Petroleum, second edition, 1948, Reinhold Publishing Corp., New York.

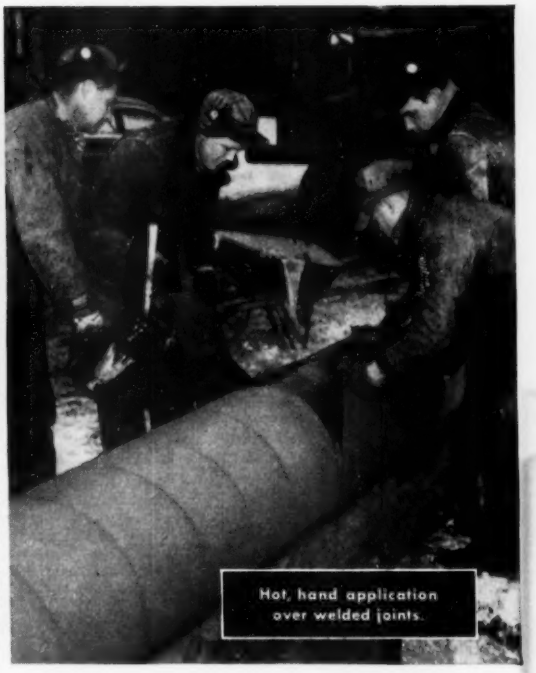
Sachanen, A. N., The Chemical Constituents of Petroleum, 1945, Reinhold Publishing Corp., New York.

Sachanen and Tilicheyev, Chemistry and Technology of Cracking, 1932, Reinhold Publishing Corp., New York.

The second edition of the classical book of Benjamin T. Brooks is one of the latest books. The new edition is a completely up-to-date survey of paraffins, olefins, and cyclic (other than aromatic) hydrocarbons. It gives complete and extensive discussions of the chemistry, methods of synthesis, thermal cracking, oxidation reactions, polymerization, alkylation, and theoretical aspects of the many nonbenzenoid hydrocarbons.

1. Natural Occurrence of the Paraffins.
2. Physical Properties of the Paraffins.
3. Methods of Synthesis of Paraffins and Cycloparaffins.
4. Thermal Decomposition of the Paraffins and Cycloparaffins.
5. Oxidation of Paraffins and Cycloparaffins.
6. Reactions of Paraffins and Cycloparaffins With Chemical Reagents.
7. Olefinic Hydrocarbons: Methods of Preparation; Isomerization.
8. Polymerization of Unsaturated Hydrocarbons.
9. Alkylation of Unsaturated Hydrocarbons.
10. Oxidation of Unsaturated Hydrocarbons.
11. Other Chemical Reactions of Olefins.
12. The Dienes, Trienes, and Polyenes.
13. Acetylenes: Properties of the Triple Bond.
14. The Cycloparaffins.




# *NO-OX-ID RUST PREVENTIVE MATERIALS*
# add life time to pipe lines

For long-term, low-maintenance underground service, NO-OX-ID and NO-OX-IDized Wrappers can be applied by hand as shown above. This method is especially adapted to application over rough terrain, on short lines or congested areas and on field joints after welding.

**COLD METHOD:** A pliable, plastic, cold NO-OX-ID is rubbed on to 1/32" thickness.

NO-OX-IDized Wrapper is applied spirally as a shield, keeping the NO-OX-ID in intimate contact with the pipe—providing a tight seal against moisture and preventing abrasive damage. Then a final coating of NO-OX-ID is brushed on.

**HOT METHOD:** A length of NO-OX-IDized Wrapper is used as a granny rag to apply hot NO-OX-ID. The wrapper is then sealed to the coating around the pipe for permanent protection.

Consult your Dearborn Engineer for the NO-OX-ID combination and method of application best suited to protect your next pipe job.

**DEARBORN CHEMICAL COMPANY**
Merchandise Mart Plaza • Chicago 54, Illinois

**GET THIS PIPE LINE BOOK**

This informative illustrated book, "Protecting Underground Pipe from Corrosion with NO-OX-ID and NO-OX-IDized Wrappers," describes the hand application, traveling machine and stationary machine methods. Also contains coverage tables on each. The coupon is for your convenience.

Dearborn Chemical Company
Merchandise Mart Plaza, Dept. OG
Chicago 54, Illinois

Please send my copy of *"Protecting Underground Pipe from Corrosion With NO-OX-ID and NO-OX-IDized Wrappers."*

Name.....

Company.....

Address.....

City.....Zone....State.....

Dearborn
Reg. U. S. Pat. Off.

NO-OX-ID
IRON + OX = RUST

THE ORIGINAL RUST PREVENTIVE

# CORROSION and its control

# Corrosion Instruments

## 1. THE POTENTIOMETER

THERE are three major systems of selecting the group of instruments to be used by the corrosion engineer: (1) that in which the basic instrument is the potentiometer; (2) the system employing a single multipurpose instrument; and (3) that using a variety of special-purpose instruments. Each of these three systems has advantages which will recommend it to those in certain circumstances; there is no clear-cut superiority of any one over the others. The present discussion will be limited to the system based on the potentiometer, with accessories to adapt it to various applications in the manifold activities of the corrosion engineer.

The basic circuit of the potentiometer is shown in Fig. 1. The unknown voltage is connected to the e.m.f. terminals and the slide adjusted until the galvanometer G shows no deflection. This indicates that no current is passing through that part of the circuit, which in turn means that the potential across the two e.m.f. terminals is equal to that portion of the battery potential across the part of the slide wire to the left of the slide. The whole length of the slide wire is divided, on the scale S, to correspond to the entire voltage of the battery, so the position of the slide when balance is obtained indicates the voltage.

There are several reasons why an instrument this simple cannot be used. First, the battery voltage could not be depended upon to remain constant. Hence, a means must be provided for adjusting the voltage applied across the slide wire. Also there must be provision for calibrating this voltage—something to adjust it to. This is taken care of by a standard cell included within the instrument case. This standard cell cannot be used for the actual measuring, since it will not maintain its accuracy unless the current drawn from it is kept at a very small value, and it should be used infrequently.

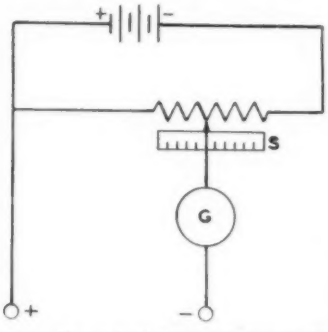
Another objection to the instrument as shown in Fig. 1 is that the galvanometer, if sensitive enough to be useful, would be burned out by a slight unbalance in the system. Consequently it is customary to place a large resistance in series with the galvanometer, and provide a push button by means of which this resistance may be short circuited for the final adjustment.

These two refinements would yield an instrument capable of all that could reasonably be demanded of it, so long as the scale encompassed by the single slide wire proved adequate. In order to extend the application of the instrument, it is necessary to provide for more than one range. This is accomplished in some instruments by providing two or more slide wires and the necessary switching arrangements or multiple terminals for their selection. One possible form of the complete instrument is shown in Fig. 2; this arrangement shows two ranges, although three or four are often found. No values are indicated for the resistors, since these will vary with different instruments. The working battery is, in field instruments, usually a six-volt dry-cell.

### Applications

With this instrument the corrosion engineer can measure the pipe-to-soil potentials, using a copper sulfate electrode; he can measure the potentials between any two protected or unprotected structures; and he can measure the potential developed by the various protective devices, although the latter may sometimes require the use of voltage dividers to extend the range of the instrument. In the most common application, pipe-to-soil potential measurement, the big advantage of the potentiometer is that it draws no current at perfect balance, and hence does not disturb the system being investigated. Even a comparatively high-resistance voltmeter may read as much as 50 per cent low if the soil is dry; the only effect on a potentiometer is a loss of sensitivity.

By using the lowest scale, on which a millivolt may be represented by an inch or more of slide wire, the extremely small IR drop caused by current flowing in pipe may be read with sufficient accuracy; often a section of pipe 100 ft. long is ample, except in the larger sizes, or where greater precision is desired. With a suitable supply of external shunts, currents may be read from milliamperes to as high a range as may be desired—hundreds of amperes, if needed. The same principle used in measuring line currents may frequently be applied to wires of known size; i.e., a length of wire having a resistance of 0.01 ohm, or some other definite value, is measured off, and the potential drop read with the instrument. This device is often useful in checking rectifier output and its distribution in ground bed elements.



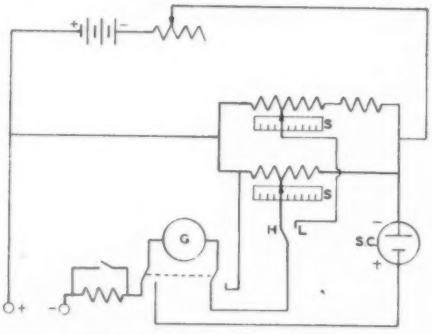




*Fig. 1—(Left) Basic potentiometer circuit. Fig. 2—(Right) Basic circuit of Fig. 1 modified to include: (1) provision for adjustment of battery voltage and calibration to a standard cell; (2) protective resistor for galvanometer; and (3) high and low scales.*

Part 23 of a series by Marshall E. Parker, consulting engineer, Houston.

THE REFINER'S notebook

No. 83

# Cleanout Openings for Oil-Storage Tanks

by I. E. Boberg* and L. P. Zick†

## 2. FIELD TESTING OF CLEANOUTS

INITIAL steps taken in development of bolted cleanouts and the test setup used have been dealt with (The Refiner's Notebook, No. 82). Through the process of elimination, a design free of serious stress concentrations was arrived at. Similar testing was then undertaken on actual tanks in the field. (While the Chicago Bridge & Iron Co. test apparatus very closely duplicated the conditions in a 100 by 40-ft. tank, it was impossible to eliminate all dissimilarities. Under load the horizontal struts would inevitably shorten and introduce a factor not present in a complete tank.)

The first field test was conducted on a 3-ft.-high by 4-ft.-wide opening in a tank 120 ft. in diameter by 48 ft. high supported on a compacted crushed stone foundation. The second field test was made on a 4 by 4-ft. opening in a tank 155 ft. in diameter by 48 ft. high resting on a concrete ring wall. Again strain-gage readings were taken on the inside and outside surfaces to determine the stress pattern and intensity. Fig. 1 illustrates a typical strain-gage setup.

In general, the field tests confirmed the model tests. The division of load above and below the opening was slightly different in the full tank from the model. The second field test indicated that special precautions must be taken when the tank shell rests on a concrete ring wall.

On the basis of the test results and in the interest of simplification, the following standard nominal sizes are recommended: (1) 2 by 2 ft.; (2) 3 by 4 ft., and (3) 4 by 4 ft.

Fig. 2 illustrates a proposed 4 by 4-ft. flush cleanout in a 120-ft. diameter by 48-ft.-high tank. It is considered essential to shop assemble the door in a short shell plate and thermally stress relieve after fabrication.

At present, no provision is made in A.P.I. Standard 12-C for openings of this type although consideration is under way. Proximity to the bottom upsets the criterion that the amount of stress carried above and below the opening is equal and hence the usual distribution of reinforcement does not apply.

In the next installment of The Refiner's Notebook a summary of results will follow. This will be an outline of the important points of design based upon analysis of all of the test results.

*Chief engineer and †research engineer, Chicago Bridge & Iron Co.

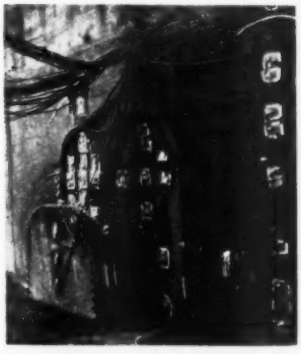


*Fig. 1—Field test of 3-ft.-high by 4-ft. door in 120-ft.-diameter by 48-ft. tank.*

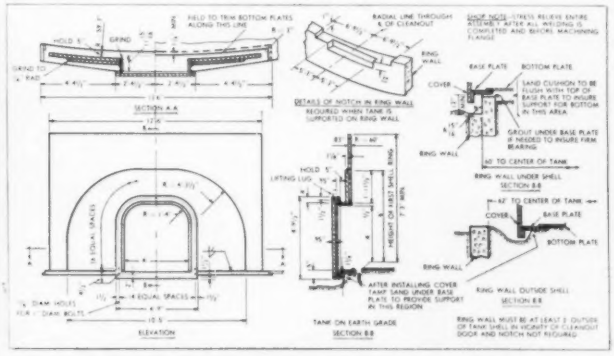


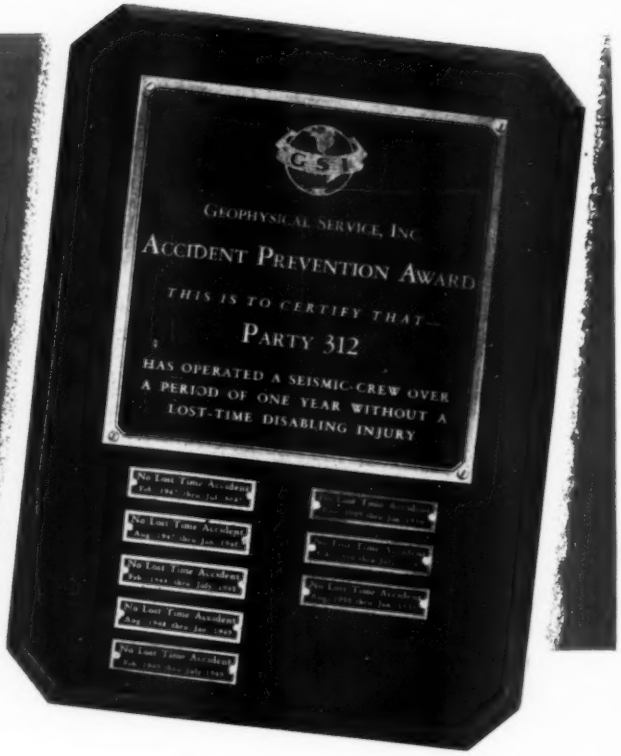
*Fig. 2—Details for a 4 by 4-ft. flush-type cleanout door in a 120-ft.-diameter by 48-ft. tank.*

# G.S.I. SALUTES

Field Party

## 312

for outstanding Safety Record


GEOPHYSICAL SERVICE, INC.
ACCIDENT PREVENTION AWARD
THIS IS TO CERTIFY THAT—
PARTY 312
HAS OPERATED A SEISMIC-CREW OVER A PERIOD OF ONE YEAR WITHOUT A LOST-TIME DISABLING INJURY

In recognition of five continuous years of seismic operation without a single lost-time accident . . . G.S.I, congratulates Party 312! G.S.I.'s seismic parties contributed to a distinguished safety record in 1950, with a total of 359 crew-months of accident-free operation—30 crew-years. The members of the field crews made this outstanding record possible.

A safety program, of which the above record is an example, is a portion of G.S.I.'s long-range planning for efficient operations.

G.S.I.'s National Safety Film Award Winner— 'Make No Mistake' —is available for free showing. Write for particulars on this outstanding color motion picture.

**GEOPHYSICAL SERVICE INC.**

6000 Lemmon Avenue • Dallas, Texas

ENGINEERING fundamentals

No. 455

# Calculation of Flood Advance

THE manner in which a water flood advances is a debatable question and one upon which research is still being performed. For engineering calculations it is necessary, however, to estimate water-flood history. To do so an assumption must be made regarding the type of flood advance. One such assumption has been that the flood proceeds as a bank behind which no oil moves and ahead of which no water moves. Based on this assumption a water-flood advance can be calculated.

A diagrammatic sketch of the linear system with fluids moving but separated as described is shown in Fig. 1. A linear system of total length L and of unit cross-sectional area is assumed. The rate of water injection is taken as equal to the rate of oil production. This means an all-liquid system of non-compressibility.

Let the pressure at the two ends of the system be $P_1$ and $P_2$. The pressure at the position of the flood bank will then be some value P lying between $P_1$ and $P_2$. When the position of the flood bank is at a point x the rate of flow can be written either according to the pressure drop ahead of the flood bank or behind the flood bank. Thus:

$$q = \frac{k_w (P - P_2)}{\mu_w (L - x)} = \frac{k_o (P_1 - P)}{\mu_o x} \quad (1)$$

Expressions for $(P - P_2)$ and $(P_1 - P)$ can be found by rearranging this equation.

Since $(P_1 - P) + (P - P_2) = (P_1 - P_2)$, then:

$$\frac{q \mu_w x}{k_w} + \frac{q \mu_o (L - x)}{k_o} = (P_1 - P_2)$$

or, this equation can be rearranged to read:

$$q = \frac{k_o/\mu_o (P_1 - P_2)}{L} \times \left[ \frac{1}{x/L (k_o \mu_w / k_w \mu_o - 1) + 1} \right] \quad (2)$$

It is seen that when displacing a given oil at a constant pressure difference, if the relative permeability values are equal, the rate of flow could increase or decrease with distance the flood traveled depending on the relative magnitudes of the oil and water viscosities. Also the value of the rate could change with x in either direction for constant fluid viscosities depending upon the values of the relative permeabilities in the areas preceding and following the flood bank.

This variation of Equation 2 is shown graphically in Figs. 2 and 3, in which case it is assumed that the pressure drop is constant. Then the value of q/const. is plotted as a function of x/L for various values of the ratio $k_o \mu_w / k_w \mu_o$ both less than unity and greater than unity. For ordinary situations the viscosity of the oil phase can be expected to be greater than that for the water phase. Hence, $\mu_w/\mu_o$ would be less than one, and in instances where the relative permeability values failed to compensate for this difference the flood advance would speed up (Fig. 3).

The type variations of these curves can be converted to type variations showing cumulative oil produced as a function of time, as in Fig. 4, because the slope of such a plot as Fig. 4 gives the rate of flow, q.

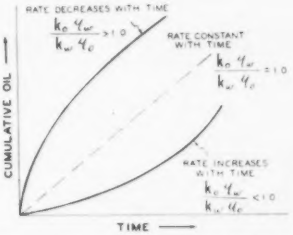



*Fig. 4—Type variation of cumulative vs. time corresponding to Figs. 2 and 3.*

### Reference

1. Levine, M. E. thesis, Pennsylvania State College, 1938.

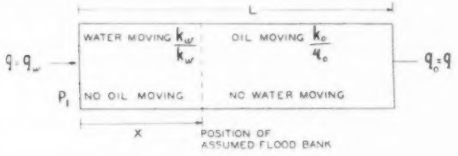



*Fig. 1.*

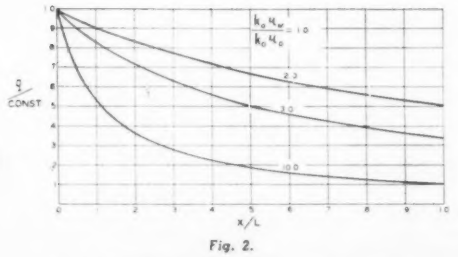



*Fig. 2.*

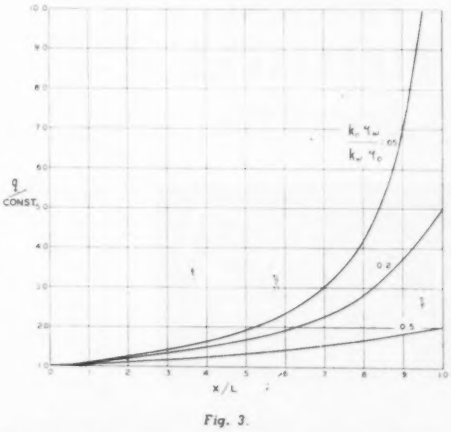



*Fig. 3.*

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College

The Best
"EQUIPMENT"
For The
"BIGGEST JOB"

IT'S AN OKLAHOMA Contracting JOB!

Pioneering
PIPELINERS
Since 1915

IT'S AN OK JOB IF IT'S DONE BY
OKlahoma
CONTRACTING CO.

6612 HARRY HINES
DALLAS, TEXAS

# Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

## Crude-Oil Pipe Lines

**Alberta-Vancouver Oil Pipe Line Co.** (Brocaw, Dixon, McKee).—972 miles, 16-in., proposed, Edmonton via Pincher Creek, Alta., Idaho and Washington states to Vancouver, B. C.

**Derby Oil Co.**—15 miles, 6-in., authorized, Wichita to Bentley, Kans. Completion date 1-1-52.

**Gulf Refining Co.**—64 miles, 10-in., authorized, Eucutta to Lumberton. Completion date 1-1-52.

**Gulf Refining Co.**—87 miles, 14-in., authorized, Lumberton to Mobile. Completion date 1-1-51.

**Interstate Oil Pipe Line Co.**—35½ miles, 12-in., under way, New Iberia to Sunset, La. Houston Contracting Co.

**Interstate Oil Pipe Line Co.**—20 miles, 6-8-in., under way, New Iberia to Weeks Island and Avery Island fields. Houston Contracting Co.

**Ohio Oil Co.**—117 miles, 22-in., authorized, Sheridan, Ind., to Lima, Ohio.

**Phillips Pipe Line Co.**—27 miles 8-in., looping from Borger, Tex., to Yale, Okla.

**Phillips Pipe Line Co.**—Authorized, Midland, Glasscock, Reagan, and Upton counties.

**Platte Pipe Line Co.**—1,075 miles, 16-20-in., under way, Worland, Wyo., to Wood River, Ill.

**Platte Pipe Line Co.**—573 miles, 16-20-in., under way, Worland, Wyo., to Holdredge, Neb. R. H. Fulton & Co. (Sections 1, 2, 3, and 4.—Section 1, 126 mi. of 16-in., remainder 20-in.). A. A. Carrigan, spreadman at Casper, Wyo., field office.

**Platte Pipe Line Co.**—142 miles, 20-in., under way, near Marysville, Kans., to Holdredge, Neb. Bishop & Lock (Section 5); H. LaQuey, spreadman.

**Platte Pipe Line Co.**—100 miles, 20-in., under way, northern edge of Kansas. Rumsey Bros., contractor of Section 6.

**Platte Pipe Line Co.**—(Section 7) 274 miles, 20-in., under way, Missouri River to Salisbury; field office, Carrollton, Mo.; O. P. Hiner, spreadman. (Section 8) Salisbury to Mississippi River; field office, Moberly, Mo.; B. C. Hall, spreadman. O. R. Burden, contractor. Completion date 9-51.

**Progress Pacific Pipe Line Co.**—900 miles, 20-in., proposed, Permian basin, West Texas, to California.

**Service Pipe Line Co.**—130 miles, 8-10-in., planned, Old Glory field to Bowie, Tex.

**Service Pipe Line Co.**—57 miles, 10-in., under way, West Bank Salt Fork Brazos River to Jud Station, Haskell County, Texas. Smith Contractors. Completion date 9-15.

**Service Pipe Line Co.**—65 miles, 10-in. under way, West Bank Salt Fork Brazos River to Bowie Station, Montague County, Texas. O. R. Burden Construction Co. Completion date 9-15.

**Sinclair Pipe Line Co.**—674 miles, 22-in., authorized; Drumright, Okla., to E. Chicago, Ind.

**Texas-New Mexico Pipe Line Co.**—75 miles, 8-in., planned, Midland to Germania pool; Midland to Scarborough and Sweetie Peck area; and Crane station to McElroy area, West Texas.

**Texas-New Mexico Pipe Line Co.**—55 miles, 8-in., planned, Eunice to Covington and Saunders area, New Mexico.

**Trans-Mountain Oil Pipeline Co.** (Sponsored by Bechtel Corp.)—715 miles, under way by July 1951, Edmonton, Alta., via Yellowhead Pass to Vancouver, B. C.

**West Texas Gulf Pipe Line Co.**—467 miles, 26-in., authorized, Colorado City to Wortham, Tex., 26-in.; Wortham to Sour Lake, Tex., 24-in. Completion date 10-52.

**West Texas Gulf Pipe Line Co.**—114 miles, 20-in., authorized, Wortham to Longview, Tex. Completion date 10-52.

## Products Pipe Lines

**Bell Oil & Gas Co.**—150 miles, 6-in., planned, Ardmore to Drumright, Okla.

**Buckeye Pipe Line Co.**—430 miles, 14-in., proposed, Linden, N. J., to Allentown, Pa., Junction; Chelsea, Pa., via Allentown Junction to Auburn, Rochester, Syracuse and Oswego, N. Y. Start 1952; finish 1953.

**Ohio Oil Co.**—24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

**Phillips Petroleum Co.**—163 miles, 12-in., looping from Borger, Tex., to Paola, Kans. Completion date 11-1-51.

**Phillips Petroleum Co.**—137 miles, 10-in., looping from Paola, Kans., to East St. Louis, Ill. Completion date 11-1-51.

**Phillips Petroleum Co.**—198 miles, 8-in., looping from East St. Louis, Ill., to East Chicago, Ind. Completion date 11-1-51.

**Plantation Pipe Line Co.**—767 miles, 14 and 18-in., under way, Baton Rouge to Charlotte, N. C., 275 miles, 14-in., under way, Bremen to Charlotte, N. C.; 432 miles, 18-in., under way, Baton Rouge to Bremen, Ga.; 220 miles, 18-in., Baton Rouge to Mississippi-Alabama state line; Williams Brothers Co. David R. Williams, Jr., project manager.

**Plantation Pipe Line Co.**—126 miles, 18-in., under way, Collins, Miss., to Baton Rouge, La. Williams Bros., contractor. O. R. Mitchell, spreadman, at Prestiss, Miss. Completion date 8-31-51.

**Plantation Pipe Line Co.**—150 miles, 18-in., under way, Moundville, Ala., to Collins, Miss. Williams Bros., contractor. A. T. Maxwell, spreadman, Meridian, Miss., Completion date 8-31-51.

**Plantation Pipe Line Co.**—200 miles, 14-in., under way, Winder, Ga., to Charlotte, N. C. Williams Bros., contractor. T. E. Davis, spreadman at Athens, Go. Completion date 10-1-51.

**Progress Pacific Pipe Line Co.**—900 miles, 10-in., proposed, California to West Texas.

**Salt Lake Pipe Line Co.**—Proposed, Pasco, Wash., to Puget Sound.

**Sinclair Pipe Line Co.**—8-in., proposed, Sinclair, Wyo., to Salt Lake City, Utah; 10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in. Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

**Standard Oil Co. (Ind.).**—144 miles, 8-in., under way by early fall, Neodesha, Kans., to Sugar Creek, Mo.

**Standard Oil Co. (Ohio).**—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

**Triangle Pipe Line Co.**—100 miles, 10-in. under way, Eldorado, Ark., to point on Mississippi River. Anderson Bros. Corp.

**Tuscarora Oil Co., Ltd.**—61 miles, 10-in., authorized, Knappenberger to Midland, Pa.

**Tuscarora Oil Co., Ltd.**—25 miles, 10-in., under way, Indiana, Pa.

## Natural-Gas Pipe Lines

**Algonquin Gas Transmission Co.**—276 miles, proposed, Greenwich, Conn., to Boston area; 492 miles, proposed, laterals-New England area.

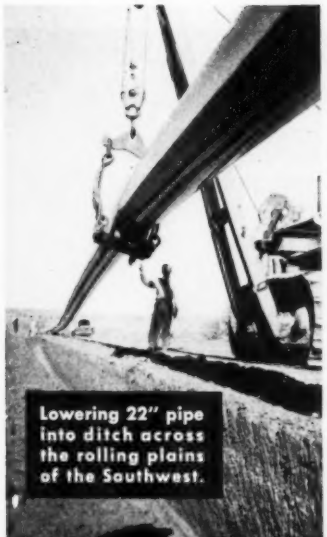
**Amere Gas Utilities Co.**—11 miles, 8-in., authorized KA-5 loop, Priceton and Athens, W. Va. Completion date December 1951.

**Amere Gas Utilities Co.**—16 miles, 8⅝-in., proposed, loops from Mercer County to Princeton, W. Va.

**Amere Gas Utilities Co.**—15 miles, 8⅝-in., proposed, near Dameron to Flat Top, W. Va.

**Associated Natural Gas Co.**—88 miles, planned, Missouri.

**Carolina Natural Gas Corp.**—185 miles,




HOUSTON CONTRACTING COMPANY
General Contractors
OIL • GAS • GASOLINE • WATER PIPE LINES
LAURENCE H. FAVROT R. P. GREGORY GEO. A. PETERKIN
3707 FERNDALE PLACE HOUSTON 6, TEXAS


2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

**Central Kentucky Natural Gas Co.**—12 miles, 20-in., line E loop, Means to Foster, Ky. Completion date October 1951.

**Central Kentucky Natural Gas Co.**—15 miles, 20-in., Cold Spring, Ky., to Anderson's Ferry, Ohio. Completion date December 1951.

**Cities of Booneville and Baldwin, Miss.**—96 miles, ¾ and 6-in., under way, Booneville and Baldwin, Miss.; M. L. Hulcher Co. Inc., contractor, Sam Carnahan, spreadman. Completion date November 1, 1951.

**Cities Service Gas Co.**—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Const. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

**Cities Service Gas Co.**—66 miles, 6-7-8-10 in., under way, takeup Hutchinson to Wichita, Kans.; Knupp Const. Co.; Newton, Kans., field office, Cliff Harris, spreadman.

**City of Alabama.**—120 miles, 2 to 8-in., under way, Alabama; Modern Welding Co. Inc., contractor, D. D. Foreman, spreadman. Completion date 9-51.

**Coast Counties Gas & Electric Co.**—4( miles, 3, 4, and 8-in., planned, Coast and Valley region, California.

**Colorado Interstate Gas Co.**—215 miles 20-in., planned, Texas Panhandle to Colorado.

**Commonwealth Natural Gas Corp.**—53 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

**Dow Chemical Co.**—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich.; Mahoney Contracting Co., contractor, Ralph Bucher, spreadman at Midland.

**East Ohio Gas Co.**—65 miles, 26-in., under way, near Petersburg to Cleveland, Ohio. Williams Bros., contractor. Completion date 12-1-51.

**East Tennessee Natural Gas Co.**—172 miles 22-in., proposed, Greenbrier to Oak Ridge Tenn.

**East Tennessee Natural Gas Co.**—100 miles, 16-in. proposed, Knoxville to Kingsport, Tenn.

**Egyptian Natural Gas Co.**—80 miles, 6-8 in., authorized, Norris City to Salem-Centralia, Ill., area.

**El Paso Natural Gas Co.**—122.9 miles, 30 in., proposed, looping along main line in Texas, New Mexico, Arizona.

**El Paso Natural Gas Co.**—470 miles, 24-in. under way, San Juan basin, New Mexico to Franconia, Ariz. Completion date 10-1-51.

**Grand Valley Pipe Line Co.**—105 miles 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

**Gulf Michigan Transmission Corp.**—68 miles, 30-in., proposed, Perryville, La. across Arkansas, Missouri, and Illinois to terminus near St. John, Ind.

**Hope Natural Gas Co.**—32 miles, 8⅝-in., under way, Terra Alta field to Fairmont, W. Va. Pipe Line Const. & Drilling Co.

**Hugoton Production Co.**—40 miles, 20 to 4-in., under way, near Ulysses, Kans., gathering system. Reese Bros. Const. Co., contractor, Hugoton, Kans., field office, Paul G. Reese, spreadman.

**Iowa-Illinois Gas & Electric Co.**—41 miles, 10-in., proposed, Washington County to Cedar Rapids, Iowa.

**Illinois Gas Co.**—15 miles, 4-in., under way, Lawrenceville, Ill. L. R. Young Const. Co., contractor. Completion date 8-1-51.

**Kansas-Nebraska Natural Gas Co.**—65 miles, 2-8-in., planned, Big Springs field to Ogallala, Neb., and to Ovid, Colo.

**Kansas-Nebraska Natural Gas Co., Inc.**—39 miles, 4 and 6-in., planned, Neligh to O'Neill, Neb., 54 miles, 4 and 6-in. planned, Neligh to Hartington, Neb. (extension) Completion date 1952.

**Kansas Power & Light Co.**—10 miles, 8-in., authorized, parallel 6-in., north from Larned, Kans.

**Kansas Power & Light Co.**—27 miles, 20-in., authorized, Pratt, Kans., to Calista compressor station.

**Kansas Power & Light Co.**—9 miles, 16-in., authorized, parallel 16-in., northeast of McPherson, Kans.

**Manufacturers Light & Heat Co.**—78 miles, 16-in., contracted, Berwindale, Pa., to near


GENERAL
PIPE LINE
CONTRACTORS

Personal Supervision on Construction of Your

Pipe Lines • Water Lines
Sewer Lines • Excavations
Salt Water Disposals

TROJAN
CONSTRUCTION CO.
INCORPORATED
1416½ N. ROBINSON
OKLA. CITY, OKLA. PH. 2-7696
WAREHOUSE PHONE 6-1430



We're NEW!

We're contributing to
PROGRESS
in the
OIL AND GAS INDUSTRY

• • •

With a new approach to Pipelining . . . a service-wise approach that is a headache-remover!

A type of service never offered before! In fact . . . a PACKAGE of Services!

• • •

Remember it, please —
A PACKAGE
OF SERVICES

• • •

Available immediately—ready to save you time, money, worry and work.

• SURVEYING •
RIGHTS-OF-WAY PROCUREMENT
CLAIMS • MAPPING
• LOCATION •

in addition to
OTHER PHASES OF PIPELINE SERVICE

*For additional information, address your inquiry to Mr. Graham V. Taggart, Shreveport office.*

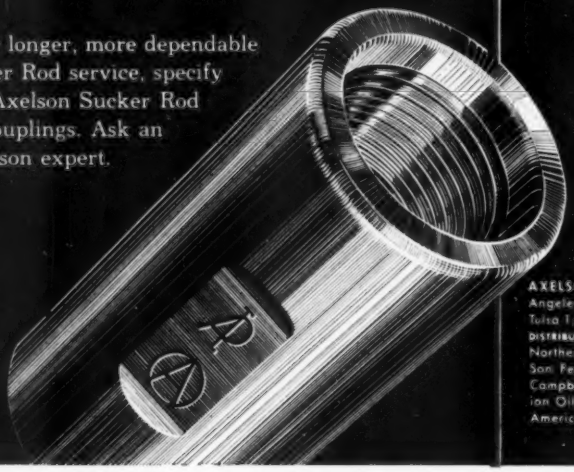
COATES
Field Service, INC.
SHREVEPORT — OKLAHOMA CITY
P. O. Box 1681 Dial 5-8661
133 Couch Dr. Dial 2-4012

# AXELSON

AXELSON FIRST CHOICE
FOR PETROLEUM
PUMPING EQUIPMENT

IT TAKES THE BEST OF EVERYTHING TO MAKE Ⓐ COUPLING . . .

For longer, more dependable Sucker Rod service, specify Axelson Sucker Rod Couplings. Ask an Axelson expert.



THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

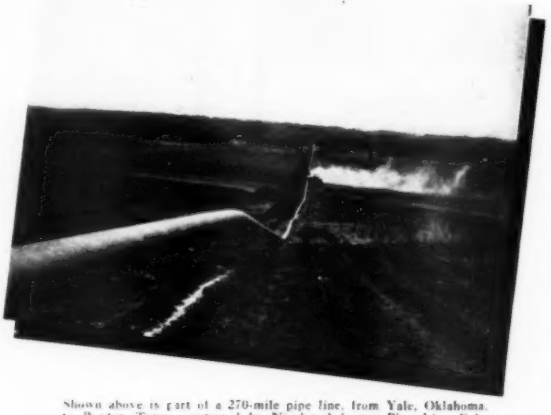
AXELSON MANUFACTURING CO. • PLANTS—Los Angeles 58, St. Louis 16 • OFFICES—New York City 7; Tulsa 1; Buenos Aires, Argentina; Caracas, Venezuela • DISTRIBUTORS—Jones & Laughlin Supply Co.; Great Northern Tool & Supply Co.; Industrial Agencies, Ltd., San Fernando, Trinidad, B.W.I.; Industrias Waldrip & Campbell, Barcelona & Maracaibo, Venezuela; Dominion Oil Field Supply Co., Ltd., Calgary, Canada; South American Supply Co., Avenida Tacna 592, Lima, Peru.

# PROVED PROTECTION
## for
# UNDERGROUND PIPE

The rugged effectiveness of Asbestos Pipe Line Felt in protecting underground pipe coatings has been proved by long-time use.

Nicolet Asbestos Pipe Line Felt is made of high quality asbestos fibers. These strong fibers make Nicolet Felt a positive reinforcement for the enamel and an effective shield against soil stress and all corrosive soil conditions.

Nicolet Felt is not a foreign material in the enamel. It is at the outside, partially imbedded, where it can stop corrosion and damage before it starts.



Shown above is part of a 270-mile pipe line, from Yale, Oklahoma, to Borger, Texas, protected by Nicolet Asbestos Pipe Line Felt. Note the continuous, even application without breaks.

*WRITE FOR OUR COMPARISON SHEET*

NICOLET ASBESTOS PIPE LINE FELT — *"the felt with a future"*

**MANUFACTURED BY:**

**NICOLET INDUSTRIES, INC.**
(FORMERLY GAMA INDUSTRIES, INC.)
70 Pine Street New York 5, N. Y.

**DISTRIBUTED BY:**

**MIDDLE WEST COATING & SUPPLY**
207-A Daniel Bldg. Tulsa, Okla. Ph. 2-5215
P. O. Box 153 or 2-5216

Saltsburg, Pa. Britton Construction Co., contractors.

**Manufacturers Light & Heat Co.**—35 miles, 16-in., under way, Berwindale to Clearfield County, Pennsylvania. Britton Construction Co., contractor, L. A. Stewart, spreadman at Philipsburg, Pa. Completion date 8-1-51.

**Manufacturers Light & Heat Co.**—31 miles, 16-in., under way, East Bank of Moshannon Creek to Trans-Penn Transit line near Hyner, Pa., Britton Construction Co., contractors, Fred McKenzie, spreadman at Renovo, Pa. Completion date 8-1-51.

**Michigan Consolidated Gas Co.**—31 miles, 24-in., under way, Austin Storage fields to Lincoln Storage field, Michigan. Anderson Bros. Corp., contractor. Completion date 8-15-51.

**Michigan Consolidated Gas Co.**—131 miles, 24-in., under way, Austin Storage fields to Detroit. Anderson Bros. Corp., contractor. Completion date 11-1-51.

**Montana Power Co.**—18 miles, 16-in., proposed, Pakowki Lake area to Canada-Montana border.

**Montana Power Co.**—52 miles, 16-in., proposed, Canada - Montana border to Cut Bank, Mont.

**Michigan Consolidated Gas Co.**—180 miles, 24-in., planned, Austin, Mich., to Detroit.

**Mississippi River Fuel Corp.**—98 miles, 16 and 18-in., authorized, feeder line from Lincoln Parish, La., to Waskom field, Harrison County, Texas.

**Mississippi River Fuel Corp.** — 40 miles, 18-in., authorized, Dubach to Perryville, La.

**Missouri Central Gas Co.**—30 miles, 6-in., under way, Moberly to Macon, Mo. L. R. Young Const. Co., contractor. Completion date 8-1-51.

**National Utilities Co. of Michigan.**—76.7 miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east to Hillsdale; 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 6 miles west to Union City.)

**Nevada Natural Gas Pipe Line Co.**—114 miles, proposed, Topock, Ariz., to Las Vegas, Nev.

**New River Gas Co.**—50 miles, planned, Summers or Monroe counties, W. Va., to Narrows and Dublin, W. Va.

**New York State Natural Gas Corp.**—39 miles, 20-in., authorized, Potter County, Pennsylvania, to Livingston and Monroe counties, New York.

**New York State Natural Gas Corp.**—26 miles, 20-in., authorized, New Kensington to South Bend, Pa.

**New York State Natural Gas Corp.**—51 miles, 20-in., authorized, New Kensington, Pa., to Ohio line.

**New York State Natural Gas Corp.** — 27 miles, 16-in. authorized, looping in Greene and Westmoreland counties.

**New York State Natural Gas Corp.**—70 miles, 20-in., planned, North Oakford, Pa., to Ohio state line.

**New York State Natural Gas Corp.**—62 miles, 20-in., under way, Murrysville, Pa., to Petersburg, Ohio; 37 miles, 20-in., under way, Boome storage field to Ithaca, N. Y. Field office, Lawrenceville, Pa. Completion date October 1951; 23 miles, 20-in., contracted, state line station to Angelica, N. Y. Office, Wellsville, N. Y. Completion date October 1951; 82½ miles, 20-in., under way, Utica to Ithaca, N. Y. Field office, Clinton, N. Y., Leman Creech, supt.; completion date 11-15-51; 85 miles, 16-in., under way by September, Utica to Albany, N. Y.; Williams-Austin Co., contractor, Ed Peters, over-all general supt.

**New York State Natural Gas Co.**—77 miles, 20-in., under way, Indiana Pa., to Petersburg, Ohio. Williams Bros., contractor. Clyde Gregory, spreadman at Leechburg, Pa. Completion date 10-31-51.

**New York State Natural Gas Co.**—65 miles, 26-in., authorized, Ohio-Pennsylvania state line northwesterly to Summit County, Ohio.

**Niagara Mohawk Power Corp.**—40 miles, 10-12-16-in., under way, lateral lines at Utica, N. Y.; 55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor, Howard Bauer, supt.

**Northeastern Gas Transmission Co.**—511 miles 20-21-in., authorized, New Hampshire, Massachusetts, and Connecticut.

**Northeastern Gas Co.**—411 miles, proposed, New England towns.

**Northern Natural Gas Co.**—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

**Northern Natural Gas Co.**—370 miles, 4-26-in., authorized, gathering lines in Hugoton field.

**Northern Natural Gas Co.**—217 miles, 26-in., under way, Palmyra, Neb., to Skellyville, Tex. G. G. Griffis Const. Co., contractor; field office, Beatrice, Neb.; G. L. Mims, superintendent; E. G. Grisham, spreadman.

**Northern Natural Gas Co.**—210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

**Northern Natural Gas Co.**—181 miles, 4-12-in., contracted, gathering system in Hugoton area. Reese Bros. Const., contractor.

**Northern Indiana Fuel & Light Co.**—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

**Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

**Ohio Fuel Gas Co.**—22 miles, 16-in. authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

**Ohio Fuel Gas Co.**—74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

**Ohio Fuel Gas Co.**—47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

**Ohio Fuel Gas Co.**—61 miles, proposed, northern and southwestern Ohio.

**Oklahoma Natural Gas Co.**—40 miles, 16-in., under way, Ninnekah, Okla., to County Line, Okla.; Trojan Construction Co., contractor.

**Oklahoma Natural Gas Co.**—26 miles, 12-in., authorized, Ringwood to Enid, Okla. Completion date January 1952.

**Oklahoma Natural Gas Co.**—40 miles, 2-36-in., authorized, Ringwood field gathering system. Completion date January 1952.

**Pacific Gas & Electric Co.**—44 miles, 8-in., under way, Salinas to King City, Calif.

**Pacific Gas and Electric Co.**—141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

**Pacific Gas & Electric Co.**—10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

**Pacific Northwest Pipe Line Co.** — 400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

**Pacific Northwest Gas Pipe Line Corp.**—2,175 miles, planned, Wharton County, Texas, via Oklahoma, Kansas, Fort Collins, Colo., to Portland, Ore., Tacoma and Seattle Wash.

**Panhandle Eastern Pipe Line Co.** — 174 miles, 30 and 26-in., contracted, Tuscola Ill., eastward—looping present system; R. A. Conyes, contractor. 44 miles, 26-in., Edgerton, Mich.; Anderson Bros.: 22 miles, 30-in., looping in Tuscola, Ill.; 45 miles, 30-in., looping in Montezuma, Ind.; 63 miles, 30-in., looping in Zionsville, Ind.

**Pennsylvania Gas Co.**—52 miles, 12-in., between Warren and Erie, Pa. (Sect. 1—27 miles, under way and contracted by Harford Bros. Sect. 2—25 miles.

**Peoples Natural Gas Co.**—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

**Phillips Petroleum Co.**—118 miles, 3-22-in. under way, Sherman and Hansford counties, Texas gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas Tex., J. F. Crawford, spreadman at Texhoma, Okla.

**Piedmont Natural Gas Co.**—28 miles, 6-in., proposed, North Carolina—laterals from Transcontinental gas system.

**Prince George's Gas Corp.**—29 miles, 22-in., authorized, between Chillum and Rockville, Md.

**Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

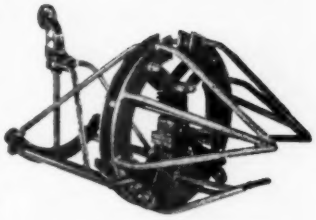
**Southern California Gas Co.** — 35 miles, planned, Antelope Valley, California.

**Southern California Gas Co.** and **Southern Counties Gas Co. of California.** — 81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

**Southern California Gas Co.**—22 miles, 22-

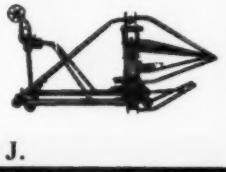

CROSE

INTERNAL LINEUP CLAMPS



*Proven in World-Wide Field Operations*

Crose Internal Lineup Clamps are available in manual, electric and hydraulic models for pipe sizes ranging from 12″ to 36″. Crose Internal Lineup Clamps have been proven in world-wide field operations.



M. J. CROSE MANUFACTURING COMPANY, INC.
2715 Dawson Road Tulsa, Okla. Ph. 6-2173

in., under way, Simi to Santa Clara River, Calif. Joe E. Young Pipeline Const. Co., contractor. Completion date 9-51.

**Southern California Gas Co.**—24 miles, 30-in., under way, Inglewood to San Ferdando Valley, California. Alex Robertson Co., contractor. Completion date 11-51.

**Southern Natural Gas Co.**—21 miles, 24-in., authorized, Perryville Station, La., to Boeuf River.

**Southern Natural Gas Co.**—14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

**Southern Natural Gas Co.**—14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

**Southern Natural Gas Co.**—375 miles, 24-in., planned, Gwinville, Miss., to Atlanta Ga.

**Southern Natural Gas Co.**—169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish, 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi, and 108 miles, 14-in., Bass Junction to Augusta, Ga.

**Southwest Gas Corp., Ltd.**—26 miles, proposed, from P. G. & E. line to Victorville, Calif.

**Sunray Oil Corp.**—133 miles, 3-30-in., under way, system for Snyder gasoline plant, Vaughan & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

**Sunray Oil Corp.**—8-in., under way, Allen to Drumright, Okla. Refinery Engineering Co., contractor. Completion date 9-51.

**Tennessee Gas Transmission Co.**—99 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

**Tennessee Gas Transmission Co.**—433 miles, planned, looping on Buffalo and New England extensions.

**Tennessee Gas Transmission Co. and Northeastern Gas Transmission Co.**—175 miles, 24-in., under way, Albany, N. Y., near Wilmington (Boston area), Mass. **Oklahoma Contracting Co.**, contractor, **Springfield, Mass.**, headquarters, Paul R. Halbert, manager, H. A. Wylie, spreadman at Pittsfield, Mass., Aldress Kilgore, spreadman at Westfield, Mass. L. B. Rea, spreadman.

**Tennessee Gas Transmission Co.**—304 miles, 24-in., proposed, between Mercer, Pa., and Utica, N. Y.; 528 miles, proposed, loops; 200 miles, proposed, miscellaneous lateral lines.

**Tennessee Gas Transmission Co.**—158 miles, 30-in., under way, vicinity of Jones, La., on the north to near Cypress, Tex., on the south; Houston Contracting Co. Four spreads located as follows: North end work at Bastrop, Tex., W. H. Hayes and M. L. Thompson, superintendents; center section at Natchitoches, La., E. C. Norris and R. E. Thornton, superintendents; south end at Conroe, Tex., F. A. Silar, superintendent.

**Tennessee Gas Transmission Co.**—64 miles 26 and 30-in., loops, contracted, South Texas. Oklahoma Contracting Co., contractor, field office, Falfurrias, Tex., Panama Shiflett, superintendent.

**Tennessee Gas Transmission Co.**—156 miles 24-in., under way, Hamburg to Onondaga-Madison County line, N. Y.; H. C. Price; Auburn and Warsaw, N. Y., field offices, G. A. Reutzel and R. K. Shivel, spreadmen.

**Tennessee Gas Transmission Co.**—120 miles, 24-in., under way, Hamburg to Hudson River; Bechtel Constructors, Inc.; Richfield Springs, N. Y., project office, R. L. Bowman and W. N. Molander, superintendents.

**Tennessee Gas Transmission Corp.**—419 miles, 26-30-in., authorized, loop line along presently authorized system.

**Texas Eastern Transmission Corp.**—791 miles, 30-in., planned, Kosciusko, Miss., to Connellsville, Pa.

**Texas Eastern Transmission Corp.**—163 miles, 30-in., under way, Kosciusko, Miss., to Florence, Ala.; Williams Bros.-Davis Co.; Kosciusko, Miss., field office, G. R. Hamilton, spreadman. Completion date 10-15-51.

**Texas Eastern Transmission Corp.**—100 miles, 30-in., contracted, Kentucky River to Ohio River in northeastern Kentucky. Mahoney Const. Co., contractor. Henry Mogg, spreadman. Completion date 10-15-51.

**Texas Eastern Transmission Corp.**—76 miles, 30-in., under way, Tennessee River to Columbia River. Eastern Pipe Line Contractors. Cliff Simmons, spreadman at Florence, Ala. Completion date 1-15-51.

**Texas Eastern Transmission Corp.**—73 miles, contracted, Columbia, Tenn., to Cumberland River. H. B. Zachry Co. A. Vaughn, spreadman at Columbia, Tenn. completion date 10-15-51.

**Texas Gas Transmission Corp.**—35 miles, 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

**Texas Gas Transmission Corp.**—189 miles, 26-in., proposed, Acadia Parish to connection with existing facilities in Morehouse Parish.

**Texas Gas Transmission Corp.**—195 miles 26-in., proposed, Gulf Coast region to southwestern Louisiana.

**Texas Gas Transmission Corp.**—425 miles 26-in., proposed, looping from Bastrop, La. to Hardinsburg, Ky.

**Texas Gas Transmission Corp.**—580 miles 26-in., proposed, Louisiana and Kentucky.

**Texas-Illinois Natural Gas Pipeline Co.**—1,300 miles 30-in., under way, Corpus Christ area to Joliet, Ill.

**Texas Illinois Natural Gas Pipe Line Corp.**—58 miles, 20-in., under way, Joliet, Ill., to Volo Meter Station, Ray L. Smith & Son, Inc., contractor; field office, Aurora, Ill.; R. M. Jones, spreadman.

**Texas-Illinois Natural Gas Pipeline Co.**—100 miles, 30-in., under way, Mississippi River to Effingham, Ill.; Midwestern Constructors Inc., contractor of Schedule 11 John Work, superintendent; field office, Vandalia, Ill. Completion date 10-15-51.

**Texas-Illinois Natural Gas Pipeline Co.**—100 miles, 30-in., under way, Effingham to Sibley, Ill., Midwestern Constructors, Inc contractor of Schedule 12, Fairbury, Ill., field office, Denver Franklin, superintendent. Completion date 9-17-51.


THE PIG WITH THE POKE — CLEANS PIPE LINES

— THE VERY LATEST —

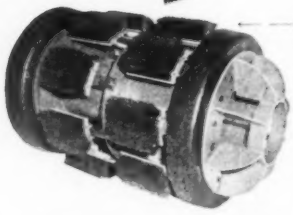
**Williamson Pipe Line Pigs***

FOR CLEANING

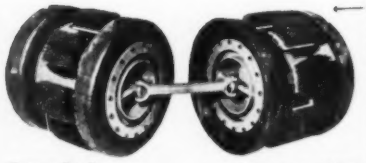
**Natural Gas Pipe Lines**

4" Size—TYPE JRN—2" to 4" sizes. Will pass 1½R-90° Bends. No valves other than full diameter thru-port valves.
Use TYPE SCN-51 for 6" Size.

8" Size — TYPE WC-11 — 8" to 14". Will traverse 6 foot radius field bends, full diameter side openings at 45°.
SPRINGS COMPENSATE for BRUSH WEAR.



20" Size—TYPE GP-2—16" to 30". 200-LB. SPRING Forces the Brushes against pipe wall —COMPENSATING for WEAR. Will traverse round-opening gate valves. SPRINGS and BRUSHES are identical and interchangeable for all types and sizes of GP PIGS.



24" Size — GP-3 — 18" to 30" Sizes will pass 1½R-90° Bends. SPRINGS COMPENSATE for BRUSH WEAR, ASSURING Full section cleaning efficiency. GP-3 consists of two Type GP-1 Pigs. — Each Unit may be used as individual pig.

*Patents Pending

P. O. Box 4038

**T. D. Williamson, Inc.**

TULSA 9, OKLAHOMA

# PUMPS

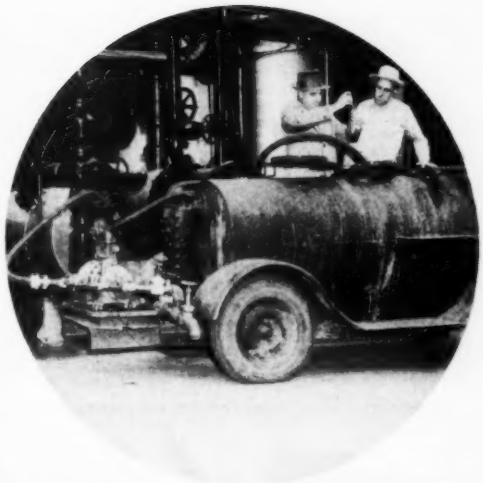
**CENTRIFUGAL**
**RECIPROCATING**

BUILDERS OF OUTSTANDING PUMPS
Since 1869

ESTABLISHED 1869

**DEAN BROTHERS PUMPS INC.**
INDIANAPOLIS IND.
323 W. TENTH ST.





# SAVE TIME—SAVE TUBES

## Clean Exchangers Chemically

The quickest and (in the long run) cheapest way to clean tubular heat exchangers is the in-place method of circulating hot solutions of chemical cleaning compounds.

**METHOD:** Circulate powerful Oakite detergent through oil side to remove carbon, wax, oil deposits. Circulate Oakite Compound No. 32 through water side to remove scale and rust. Quickly restores unit to peak heat transfer efficiency. Much quicker, more thorough than lancing with air or steam. No expensive dismantling. No damage to tubes as with rodding, drilling, or fish sawing.

Ask your local Oakite Technical Service Representative for on-site demonstration. Or write for full details. No obligation either way.

**FREE** Booklet F7629 gives Oakite story on cleaning heat exchangers; cleaning towers; reconditioning drums; cleaning tank cars; cleaning salvage parts. Write for your copy today.

OAKITE PRODUCTS, INC., 52E Thames St., NEW YORK 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
**OAKITE**
MATERIALS • METHODS • SERVICE

*Technical Service Representatives in Principal Cities of U. S. & Canada*



# Always Cold Water Gotkool WATER CANS AND COOLERS

GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug-fitting, large, removable top, handy, non-leaking, push-button faucet. GOTT Water Cans for handy field use. Your supply store has them, get one today!

**GOTKOOL WATER CAN**
Made in 1½, 2, 3, 5, 10, 15 and 20 gallon sizes. Push - Button Faucet at slight additional cost.

**GOTKOOL WATER COOLER**
Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet.

*KEEP PURE DRINKING WATER ALWAYS HANDY*
INSIST ON THE GENUINE . . . Look for the Blue and Black Label With the Name GOTKOOL in Red.

**H. P. GOTT MFG. CO.**
WINFIELD, KANSAS

**Texas-Illinois Natural Gas Pipeline Co.**—93 miles, 30-in., under way, Sibley to Joliet, Ill.; Midwestern Constructors, Inc., contractor of Schedule 13. Fairbury, Ill., field office, Denver Franklin, superintendent. Completion date 9-4-51.

**Texas-Illinois Gas Pipe Line Corp.**—40½ miles, 30-in., contracted. Arkansas and Missouri; Bechtel Corp. V. L. Williams, supt. at Little Rock, Ark.

**Texas Illinois Natural Gas Pipe Line Co.**—98 miles, 30-in., under way. Urbana to Garrison, Tex. H. C. Price, contractor. Completion date 8-29-51.

**Texas Illinois Natural Gas Pipe Line Co.**—98 miles, 30-in., under way. Garrison, Tex., to Texas-Arkansas state line. H. C. Price, contractor. Completion date 9-18-51.

**Texas Illinois Natural Gas Pipe Line Co.** 106 miles, 30-in., under way. Texas-Arkansas state line to Malvern, Ark. Bechtel Corp., contractor. Completion date 10-15-51.

**Texas Illinois Natural Gas Pipe Line Co.**—130 miles, 30-in., under way. Malvern to Newport, Ark. Bechtel Corp. Completion date 10-15-51.

**Texas Illinois Natural Gas Pipe Line Co.**—74 miles, 30-in., under way. Newport to Moark, Ark. Bechtel Corp., contractor. Completion date 10-15-51.

**Texas-Illinois Gas Pipe Line Corp.**—30½ miles, 30-in., under way; Trinity River to Texarkana; H. C. Price, contractor. C. E. Shivel, spreadman at Carthage; C. R. Ice, spreadman at Nacogdoches.

**Transcontinental Gas Pipe Line Corp.**—35 miles, 24-in., authorized, Paterson lateral to Greenwich, Conn.

**Trunkline Gas Co.**—1,775 miles, 18-26-in., under way, includes 740-mile, 26-in. Lake Charles, La., to Tuscola Station of Panhandle Eastern Pipe Line Co., and 1,035 miles, 16-24-in., Lake Charles, La., to McAllen, Tex., completion due October 1, 1952.

**Trunkline Gas Co.**—50 miles, 26-in., contracted, Longville to northeast vicinity of Hineston, La.; 126 miles, 26-in., contracted Epps to Hineston, La.; 42 miles, 16-20-in., under way, Lake Arthur, Longville to point north of Iowa, La., (Section 1, lateral line); 33 miles, 20-in., under way, Lake Arthur, La., to Lacassine, La.; Houston Contracting Co., contractor.

**Trunkline Gas Co.**—176 miles, 26-in., under way, Darnell, La., to Longville, La.; Houston Contracting Co., contractor of Section A, main line. E. C. Norris, Olla, La., spreadman. W. H. Hayes, spreadman, De Ridder, La.

**Trunkline Gas Co.**—180 miles, 26-in., contracted, Darnell, La., to Senatobia, Miss.; Anderson Bros. Corp., contractor, Section B, main line.

**Trunkline Gas Co.**—184 miles, 26-in., under way, Senatobia, Miss., to Paducah, Ky.; R. H. Fulton & Co., contractor of Section C, main line. Clark Williams, Memphis, Tenn., spreadman.

**Trunkline Gas Co.**—262 miles, 20-in., contracted, McAllen to Altair, Tex.; R. H. Fulton & Co., contractor of Section E and F, lateral lines.

**Trunkline Gas Co.**—217 miles, 24-in., contracted, Longville, La., to Altair, Tex.; Anderson Bros. Corp., contractor of Sections G and H, lateral line.

**Trunkline Gas Co.**—184 miles, 26-in., under way, Senatobia, Miss., to Joppa, Ill. R. H. Fulton & Co., contractor, Clark Williams spreadman, Union City, Tenn.

**Union Gas & Electric Co.**—35 miles, 8-in., Bloomington to Harris, Ill. O. R. Burden, contractor. Floyd Lewis, spreadman at Bloomington, Ill., Fall completion date.

**United Fuel Gas Co.**—29 miles, 20-in., authorized, Lanham to Broad Run, W. Va.

**United Gas Pipe Line Co.**—90 miles, 8-10-12-16-in., under way, Chalmette to Venice and West Bay Field, La. Brown & Root, Inc., contractor, J. W. Kincy, spreadman at Harvey, La. Completion date 9-51.

**United Gas Pipe Line Co.**—50 miles, 16-in., authorized, Baldwin County, Alabama, southeasterly to Escambia County, Florida.

**United Gas Pipe Line Co.**—100 miles, 20-24-26-in., contracted, Near Houma to Franklin, La.; Associated Pipe Line Contractors, Inc.

**United Gas Pipe Line Corp.**—510 miles, 24-26-30-in., contracted, Agua Dulce, Tex., to Monroe, La.; 333 miles, 20-24-26-30-in., from Pure Oil Co.'s offshore platform Block 32 Eugene Island area to Jackson, Miss., comp. sta.; 60 miles, 12-16-20-in., from Lafayette comp. sta. and Weeks Island field to Franklin, La., to connect with above mentioned 30-in.; 59 miles, 30-in., Jackson comp. sta., Miss., to Texas Eastern Trans. Corp.; 124 miles, Sterlington comp. sta. near Monroe, La., to Jackson comp. sta., Miss.; 23 miles, 8-12-16-in., South Louisiana facilities; all contracted by Gulf Southern Contractors, a joint venture including Texas Louisiana Contractors; Oklahoma Contracting Co.; J. Ray McDermott and Morrison-Knudson. Inspection by Brown & Root, Inc.

**United Gas Pipe Line Co.**—30-in., contracted, Gonzales, La., to Koscuisko, Miss. Texas-Louisiana Contractors. Completion date 11-51.

**United Gas Pipe Line Co.**—24-in., contracted, Baxterville, La., to McComb; Texas-Louisiana Contractors. Completion date 11-51.

**U. S. Army Engineers.**—190 miles, 6⅝-in., under way, Searsport to Limestone, Me.; Associated Pipe Line Contractors, Inc. Completion date 10-15-51.

**Utah Natural Gas Co.**—360 miles, 22-in., proposed, San Juan Basin area to Salt Lake Utah.

**Virginia Natural Gas Co.**—153 miles, Buckingham to Richmond and Portsmouth, Va.

**Westcoast Transmission Co., Ltd.**—1,408 miles, 30-in., planned, northern Alberta to Vancouver, B. C., and northern California.

**Western Kentucky Gas Co.**—2 to 4-in., under way, additions to present system; Modern Welding Co., Inc., contractor.

**Western Pipe Lines.**—1,200 miles, 22-in., planned, Southern Alberta to Duluth, Minn.

**West Texas Gas Co.**—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

### Foreign Crude-Oil Pipe Lines—Planned and Under Way

**Alberta Pacific Oil Pipe Line Co. (Brokaw, Dixon, McKee).**—970 miles, 16-in. proposed, Edmonton south to Kingsgate.

SHORT ON COSTS

"FACTORY PROCESSED"
NEW-GUARANTEED
6 x 6's

Diamond-T 6 x 6 with 529 cu. in. RXC Hercules Engine, 5-speed Clark transmission, Timken tandem, air brakes, 9.00 x 20 M & S tires.

This truck is an example of the high quality "Factory Processing" obtainable at Zeligson where you get the cream of the crop of Army surplus trucks. On the highway or in the field New-Guaranteed "Factory Processed" 6 x 6 trucks from Zeligson assure you long performance at low initial cost.

WRITE US — WIRE US — CALL US

ZELIGSON
TRUCK and EQUIPMENT COMPANY
6700 E. ADMIRAL PLACE TULSA, OKLAHOMA

WRITE FOR THE LATEST COMPLETE MILITARY PARTS CATALOG

SCHIELD "BANTAM" CRANES

B. C., to Washington to Vancouver, B. C.

**Basrah Petroleum Co.**—72 miles, 12-16-in., under way, Zubair to Fao, Iraq.

**Cia. de Petroleo Ganso Azul, Ltd.**—48 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

**Condor S.P.A. (Shell).**—80 miles, planned, Genoa to Rho, near Milan, Italy.

**Direccion General de Yacimientos Petroliferos Fiscales.**—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

**Independent Pipe Line Co.**—721 miles, 16-18-22-in., proposed, Edmonton to Vancouver. Spreads as follows: 185 miles of 22-in.; 391 miles, 20-in.; 95 miles, 16-in.; and 30 miles, 18-in.

**Iraq Petroleum Co., Ltd.**—556 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

**Middle East Pipelines, Ltd.**—800 miles, 34-36-in., planned, Iran to a Levantine port.

**Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

**Petroleos Mexicanos.**—100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

**Shell Caribbean Petroleum Corp.**—10 miles, 20-in., under way, Across Lake Maracaibo, Venezuela, S. A. Mahoney Contracting Co.; Angelo Tavernaro, superintendent.

**Shell Caribbean Petroleum Co.**—165 miles, 30-in., under way; Palmarejo to terminals on the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 12-51. Land sections contracted by Williams Brothers, de Venezuela, S. A., Charles P. Williams, manager, Marvin E. Jones, superintendent. Water crossings contracted by Mahoney Contracting Co.

**Shell Caribbean Petroleum Co.**—16 miles, 14-in., under way, Tia Juana to Cabimas (hot oil).

**Trans-Mountain Oil Pipe Line Co.**—715 miles, proposed, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd contractor. Completion date 1952.

**Winnipeg Pipe Line Co., Ltd.**—75 miles, 10-in., under way, Gretna to Winnipeg, Manitoba; Sparling-Fowler Co., Ltd.

### Foreign Products Pipe Lines—Planned and Under Way

**Colombia Ministry of Petroleum.**—90 miles, 8-in., planned, Puerto Berrio to La Dorada, Colombia.

**Colombia Ministry of Petroleum.**—113 miles, 6-in., contracted, Puerto Berrio to Acededo near Medellin, Colombia. Carolina Construction Co.

**Colombian Ministry of Petroleum.**—75 miles, 4-in., planned. Buena Ventura to Cali, Colombia.

**Empresa de Ferrocarriles Ecuatorianos.**—50 miles, 4-in., under way, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor.

**Estrada de Ferro Santos Jundial.**—32 miles, 10-in., under way, Santos to Sao Paulo, Brazil; Techint, contractor.

**Estrada de Ferro Santos a Jundial.**—32 miles, 18-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor.

**Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

**Imperial Oil Co., Ltd.**—10-in., planned, Sarnia to London, Hamilton to Toronto.

**Petrocongo (Sub. Cie. Financiere Belge des Petroles, S. A.).**—225 miles, considered, Ango-Ango to Leopoldville, Belgian Congo.

**Petroleos Mexicanos.**—153 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

**Societe des Transports Petroliers par Pipe Line.**—140 miles, 10-in., under way, Le Havre to Paris, France. Entrepose, contractor. Completion date 1952.

**State of Cundinamarca, Colombia.**—120 miles, 6-in., Puerto Salgar, to Bogota, Colombia; Williams Brothers Corp., David Louthen, manager, Bogota.

**Trans-Northern Pipe Line Co.**—400 miles, proposed, Hamilton, Ont., to Toronto, Ont., to Montreal, Que., Canada.

### Foreign Natural-Gas Pipe Lines—Planned and Under Way

**Azienda Generale Italiana Petroli.**—110 miles, 12-14-16-in., planned. Cortemaggiore to Genoa.

**Azienda Generale Italiana Petroli.**—110 miles, planned. Cortemaggiore to Bologna.

**Azienda General Italiana Petroli.**—145 miles, 14-16-in., under way. Cortemaggiore to Torino. Completion date 1951.

**Canadian Delhi Oil Co. (Subsidiary Delhi Oil Co.).**—2,132 miles, proposed. Alberta, Toronto, Montreal.

**Direccion General del Gas del Estado.**—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

**Northwest Natural Gas Co.**—950 miles, 34-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

**Northwestern Utilities, Ltd.**—35 miles, 16-in., authorized, Viking to Shonts.

**Petroleos Mexicanos.**—205 miles, 16-in., considered, Monterrey to Torreon, Mexico.

**Petroleos Mexicanos.**—260 miles, 20-in., under way, Monterrey to Tampico and Poza Rica, Mexico.

**Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.**—600 miles, planned, Reynosa, Tamaulipas, to Tampico-Poza Rica, Mexico.

**Trans-Canada Pipe Lines, Ltd.**—Proposed, Alberta to Toronto and Montreal.

**Union Gas Co. of Canada, Ltd.**—61 miles, 16-in., under way, facilities Dawn Township, County of Lambton, Province of Ontario; Shaw Const. Co.

**Venezuela Atlantic Transmission Corp.**—195 miles, 10-12-16-in., under way, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaira, Maracay, and Valencia. Contracted by Williams Brothers, de Venezuela, S. A., B. E. Barnes, manager.

**Western Pipe Lines.**—1,200 miles, 22-in., planned, southern Alberta, Winnipeg, to Duluth, Minn.

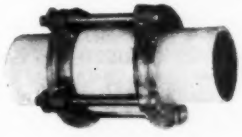

# CLAMP DOWN ON LEAKS

## ...day or night, in a matter of minutes

All you do with a Dresser Clamp is put it around the leaking pipe and tighten a few bolts. It's the quick, simple way to stop leaks in any weather, on any pipe—without shutting down. They're favored by maintenance men everywhere.

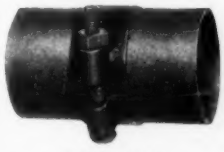
68 years of piping experience stand behind these modern clamps. Specify Dresser Grade 29 Gaskets for greater protection.

The four styles shown here are just part of Dresser's complete line of repair products. Your nearest oilfield supply store carries them... and you can get overnight delivery from our Houston warehouse. For complete specifications, write for our Oilfield Catalog. Be ready for fast repairs by keeping Dressers in stock.



COLLAR CLAMP

Styles 4 and 41, for repairing and preventing leaks through threads of screw collars.

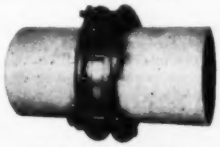


BAND CLAMP

Style 77B, for repairing small leaks and holes in the run of pipe.

SPLIT REPAIR CLAMP

Style 79B, for repairing pitholes and longitudinal splits in pipe.



POROUS-WELD CLAMP

Style 55, for repairing circumferential weld leaks.

**DRESSER** REPAIR CLAMPS

Dresser Manufacturing Division, 59 Fisher Avenue, Bradford, Pa. (One of the Dresser Industries). Houston Office and Warehouse: 1121 Rothwell Street, Houston, Texas. Sales Offices: New York, Chicago, Houston, San Francisco.

RIVER CLAMPS

LLOYD METAL FOUNDRY CO.
Carr and Opelousas Streets
Phone PR 5325
HOUSTON, TEXAS

**Duncan was Drowning**

**RED TAPE WAS UP TO HIS EARS. HE HADN'T THE TIME NOR THE KNOW-HOW TO FILL OUT THOSE EXPORT PAPERS. (BUT THEY HAD TO GO!)**

*Relax, Dunc. Read below...*

**PROCESSING AND PACKAGING:** Scientific processing against corrosion, moisture, air, dust, all climatic conditions. Packaging for export or domestic shipment.

**DOCUMENTATION:** Preparation and forwarding the special documents in export shipping.

**AIR SHIPPING:** As agent for International Air Transport we arrange all details of shipment by air.

**COUNSELING:** At no obligation we will advise you on many of the complicated details of export shipping.

**TULSA CRATING CO.**
519 SO. ROCKFORD • TULSA 10, U.S.A.
PHONES 3-6482, 3-3492

# PIPE LINES

## Plains Pipe Line Plans Main-Line Extension

BARTLESVILLE, Okla.—Plains Pipe Line Co. has announced plans to extend its main line to the Stanton area of Martin County, Texas, and the Denton area of Lea County, New Mexico.

D. M. McBride, Plains president, said 20 miles of main line will be built from the Phillips Pipe Line Co. system in the Wasson area of Yoakum County, Texas, into the Denton area of eastern Lea County, thence northward along the Denton producing trend.

The line also will be extended 9 miles from Germania pool of Midland County, Texas, to the Stanton area of southeastern Martin County.

Plains Pipe Line, owned jointly by Phillips Petroleum Co. and Cities Service Oil Co., was organized in June to operate the new crude line and gathering system in the Spraberry trend. *(The Oil and Gas Journal, June 21, page 349).*

The system extends through prospective producing territory to Midland, Glasscock, Reagan, and Upton counties, Texas. It hooks into Phillips' 12-in. trunk line to Borger, Tex., at Goldsmith, and into Basin Pipe Line System, of which Cities Service is part owner, at Midland.

## Texas-Illinois Tests South Texas Section of Big Line

CORPUS CHRISTI.—Tests are under way in the South Texas section of Texas-Illinois Gas Pipeline Co.'s Gulf Coast-to-Chicago line.

With the exception of meter stations, all South Texas construction on the pipe line has been completed. Most of the construction work in the rest of Texas and Arkansas also is finished.

Gas is expected to be moving through the line about December 1.

Original capacity of the line is 374,000 M.c.f. daily, with an ultimate design capacity of 524,000 M.c.f. Most of the gas for the system will be obtained in Jim Wells, Brooks, Duval, Live Oak, Brazoria, and Matagorda counties — all located in the Texas Gulf Coast region.

## Chapman Promises Steel for Stalled Platte Crude Line

DENVER.—Secretary of the Interior Oscar L. Chapman last week assured the Rocky Mountain Oil and Gas Association that the Platte Pipe Line Co. crude line from Chatham, Wyo., to Wood River, Ill., would be completed.

Chapman's announcement followed a statement by Defense Production Authority officials to the effect that sufficient steel would be available in the fourth quarter of this year to permit an early start on construction of a 591-mile gap in the 1,100-mile line.

Chapman said some fourth-quarter steel would be allocated for the line. The exact amount would be determined by DPA in a few days when figures are worked out for the entire industry. He added that he hoped enough steel could be allocated for the line during the first quarter of 1952, so that it could "really get going."

Platte Pipe Line is a joint venture by five oil companies. Sinclair Pipe Line Co. was designated operator for Continental Oil Co., British American Oil Producing Co., Ohio Oil Co., Pure Oil Co., and Sinclair. The line is estimated to cost approximately $60,000,000.

## El Paso Resumes Work on Last Segment of Big Line

EL PASO, Tex.—El Paso Natural Gas Co. has resumed construction of the last 32-mile segment of the big 24-in., natural-gas trunk line from the San Juan basin area to Topock, Ariz.

The $44,000,000 line is due to be completed soon after a dispute between El Paso and the Department of the Interior had stalled construction for several months.

Secretary Oscar Chapman refused to grant right-of-way across public lands until El Paso should comply with certain common-carrier provisions. The company took the case before the federal District Court and won on the basis that Chapman had attempted to exert rulings after work had been committed. The case was carried to the U. S. Court of Appeals which upheld the lower court's decision.

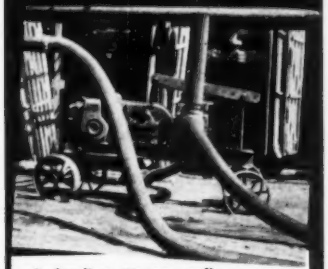
## Texas-New Mexico to Build Midland County Crude Line

HOUSTON. — Texas - New Mexico Pipe Line Co. has awarded contract for construction of approximately 30 miles of crude line in Midland County, Texas.

The crude-oil line will connect Scharbauer and Sweetie Peck fields with the Midland station of Basin Pipe Line system. Twenty-seven miles of the line will be of 8⅝-in., and 2.7 miles will be 6⅝-in.

Carl H. Dunn, Fort Worth contrac-

Clean cooling towers the low-cost way with MARLOW MUD HOG PUMPS!

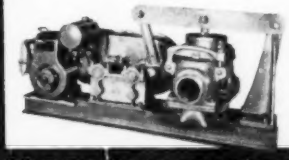


A leading Kansas refinery uses this 4 inch Marlow Mud Hog pump to save time and money in the cleaning of cooling towers.

This and many other progressive refineries can remember when it took a refinery shut down and about twelve men to shovel the muck out of their cooling tower basins. Now, with a Marlow Mud Hog the muck is pumped into a settling basin for convenient disposal — a spare time operation that requires just two men to circulate a gathering dome. Still more important, the cleaning can be done *without costly shut downs.*

A Marlow Mud Hog helps pay for itself quickly by doing many additional pumping jobs, too — cleaning out sumps, tank bottoms and other important refinery services. Write for complete information.

Available base mounted or with steel wheels or rubber tires.



MARLOW PUMPS

544 GREENWOOD AVENUE
RIDGEWOOD, N. J.

*Manufacturers of the World's largest line of dependable Self-Priming Centrifugal, Diaphragm and Plunger Pumps.*

tor, holds the contract. Work is scheduled to begin immediately and completion is slated for the middle of September.

## Gulf Starts New Crude Line From Mississippi to Mobile

HOUSTON. — Gulf Refining Co. is starting construction on the 64-mile, 10-in. Eucutta-Lumberton, Miss., section of the Eucutta - Mobile, Ala., crude-oil line.

The section has been contracted by L. E. Farley, Inc. Project plans call for laying the remaining 88 miles of 14-in. later.

Delivery of part of the pipe for West Texas Gulf Pipe Line Corp.'s 581-mile project is reported to be scheduled in the fourth quarter of 1951 and the first quarter of 1952.

## United Reroutes Submarine Line Off Louisiana Coast

WASHINGTON.—United Gas Pipe Line Co., Shreveport, has obtained permission from the Federal Power Commission to alter its plans for its new submarine gas line to be built off the Louisiana Gulf Coast.

The change will save 247 tons of pipe, $128,000 in construction costs, and shorten the 14-in. line over a mile from 12.3 to 11 miles.

The line will originate at United's platform in Block 32 and run southwest to a platform operated by Magnolia Petroleum Co., Continental Oil Co., and Newmont Oil Co.; instead of starting at Pure Oil Co.'s platform as originally planned. Pure's platform is about 1,000 ft. from United's.

Construction was first estimated to cost $1,279,657.

## Associated Natural Gets Missouri-Lines Clearance

WASHINGTON.—Associated Natural Gas Co., Tulsa, has received final authorization from the Federal Power Commission to build 88 miles of new pipe lines for service to 13 additional towns in southeastern Missouri.

The company has contracts with Texas Eastern Transmission Corp., Houston, to purchase 4,500,000 cu. ft. of gas per day.

## Pipe-Line Briefs

**Ohio Fuel Gas Co., during a world**-wide search for pipe, recently bought 21,000 ft. of 10¾-in. which was still on board ship destined for Houston from German mills at Dusseldorf. Another Columbia Gas System subsidiary, Manufacturer's Light & Heat Co. obtained 10,000 ft. from the same shipment. In all, companies of the Columbia organization have purchased around 6,400 tons of foreign pipe and are looking for more.

"Everything for the Pipeliner"

PIPE COATING and WRAPPING MACHINES
Stationary and Line Traveling

PIPE CLEANING and PRIMING MACHINES
Stationary and Line Traveling

American Steel Works
HEATING KETTLES

PIPE LINE SUPPLIES AND EQUIPMENT

PERRAULT Brothers

1130 NORTH BOSTON,
TULSA 6, OKLAHOMA
Phone 5-1104

S. E. HUEY & CO.
ENGINEERS & SURVEYORS
OUACHITA BANK BLDG.
MONROE, LA.

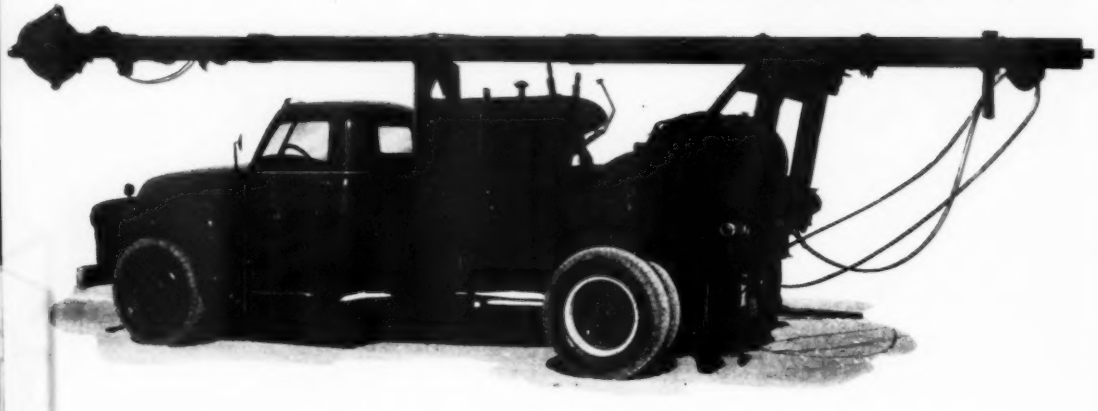
SURVEYING & MAPPING

PIPE LINE SURVEYS

EXCEL-SO
COALESCERS
remove all free water from products streams prior to dessicant dehydration.
*Send For Descriptive Bulletin*

WARNER LEWIS COMPANY
P. O. BOX 3096-A • TULSA, OKLA

# Here's the Answer for SERVICING to 3000'!



## COOPER–ALLIS-CHALMERS
# Model W-201 WINCHES. . .

## ECONOMY ---- That hasn't Been Matched

1. Hundreds of these Cooper—Allis-Chalmers Model W-201 Winches are being used every day by contractors and producers, who vouch for their unmatched economy.

2. DEPENDABLE—Like all Cooper—Allis-Chalmers units the W-201 is built with the rugged construction to "stay in there" for years. The medium speed engine is a miser with fuel and with removable wet cylinder liners, valve-in-head construction, forced feed lubrication to every moving part, it is easy and cheap to maintain.

3. SAFE and FAST at the well — Two large 26" dia. x 5" face brakes, all steel construction, all shafts on ball or roller bearings.

4. EASY and FAST for the operator—Finger tip vacuum controlled positive clutches, no slipping, no lining, built for years of trouble free service.

5. BALANCED CONSTRUCTION — Perfect load mounting on small 1 ton to 1½ ton truck, with low center of gravity, even when equipped with telescoping mast.

6. COMPLETE EQUIPMENT AVAILABLE for any job. Jerk line spudder for clean-out, rotary drive equipment for water well or shallow oil well drilling and work-over. Single or double pole telescoping masts available.

7. Built in single or double drum for truck mounting, or trailer mounted they can be pulled behind pick-up or small trucks, skid unit for pipe pulling or self-propelled tractor units.

If you are looking for a low cost, low maintenance, easy to operate servicing, drilling or work-over unit, be sure to see the Cooper—Allis-Chalmers line of modern equipment.

**FRED E. Cooper, Inc.**

P. O. Box 1890 TULSA, OKLA.

Houston, Odessa, Los Angeles

Western Canada: Rocky Mountain Supply Co., Ltd., Calgary, Edmonton, Redwater

# NATURAL GAS

## Bunola Progress

### Work 85 per cent complete on gas-storage facilities

PITTSBURGH.—Construction work on the enlargement of Denniston Pa., compressor station of Equitable Gas Co. is 85 per cent complete, F. N. Wolf, vice president in charge of engineering for Equitable Gas System, said here last week.

The new station, comprising three 1,100-hp. compressor units, will replace existing compressor. Other facilities include a glycol-dehydration plant, scrubbers and auxiliary equipment. New facilities will service Bunola, Tepe, and Finleyville underground-storage pools.

Under construction is Bunola storage pool, which will be the largest of the entire Equitable Gas System, both in delivery capacity and storage size. Total storage capacity will be 10.5 billion cubic feet at 1,000 psi., permanent inventory or cushion will be 5.25 billion cubic feet, affording an in-and-out capacity of 5.25 billion cubic feet. Deliverability will be 80 million cubic feet per day at 1,000 psi. Cost is estimated at $800,000.

The current expansion is part of an underground-storage program which has been under way since 1936. Maximum volume of gas in underground storage at the beginning of the 1950-51 heating season was 16,764,000 M.c.f. Minimum volume at the end of the heating season was 9,975,000 M.c.f., Wolf said.

## O.N.G. Increasing Depew Injections by 20,000 M.c.f.

DEPEW, Okla. — Injection volumes of 100,000 M.c.f. of natural gas per day are expected to be reached by August 10 when the fourth 1,100-hp. compressor is placed in operation at Oklahoma Natural Gas Co.'s underground-storage reservoir 4½ miles south of here.

Currently, an average of 80,000 M.c.f. per day is being returned to the 3,250-ft. Dutcher-sand reservoir through four injection wells. An additional four injection wells will be placed in service by September 1.

Installation of a specially designed dehydration unit is due next month. It will handle 200,000 M.c.f. of gas per day. Oklahoma Natural plans to install new high-pressure lines to permit higher suction pressures thereby bringing about return of as much as 135,000 M.c.f. by the summer of 1952.

The reservoir has a capacity of 48 billion cubic feet. However, in-and-out available capacity will be 13.8 billion cubic feet above 400-psi. "cushion" pressure, so that the permanent inventory will be 34.2 billion cubic feet.

## Texas August Gas Allowable Exceeds 4 Billion Cubic Feet

AUSTIN.—More than 4 billion cubic feet of gas daily will be produced in Texas during the month of August, if operators meet the natural-gas allowables.

The Texas Railroad Commission has set a daily allowable figure of 4,095,649,419 cu. ft. for the production of sweet and sour natural gas in Texas fields.

West Panhandle field is the top producer by far, with an allowable set at 2,029,889,870 cu. ft., almost half of the state total. Runnerup position is held by Carthage field in East Texas with a daily allowable of 822,572,774 cu. ft.

# Natural Gasoline

## Ringwood Start

### Warren gets rapid tax writeoff, work begins

CERTIFICATE was received last week by Warren Petroleum Corp. from the Defense Production Administration for a 5-year tax writeoff of a $1,585,570 natural-gasoline plant now being built in Ringwood field of Major County, Oklahoma. Seventy-five per cent of plant cost was certified for rapid tax amortization. Oklahoma Natural Gas Co. is part-owner of the plant. *(The Oil and Gas Journal, February 15, page 64).*

Also last week, foundations were poured for five 2,500-hp. compressors which will be used to boost inlet-field gas in three stages from atmospheric pressure to 760 psi. for liquid extraction at the plant. Mat has been poured for generator, cooling tower, and liquid-storage facilities.

Construction is planned soon on 45 miles of 4 to 36-in. gathering system. The entire system will be completed by March 1, 1952. Contractor is Gasoline Plant Construction Corp., Houston.

Capacity of the new plant will be 50,000 M.c.f. per day. Liquid recoveries are calculated to be 30,000 gal. per day of propane, 30,000 gal. per day of butane, and 40,000 gal. per day of 26-lb. R.v.p. natural gasoline. Depending on market requirements, the R.v.p. of the L.P.G. will range from 65 to 125 lb.

**Reserve estimate.** — Reserves behind the plant were 197 billion cubic feet of gas in place as of December 1, 1950. These included 14,000 proved developed acres totaling 129.2 billion cubic feet, and 8,000 proved undeveloped acres totaling 73.8 billion cubic feet. Total reserves stood at 203 billion cubic feet from 22,000 acres minus cumulative recovery of 6 billion cubic feet December 1, 1950.

From the Ringwood plant, Oklahoma Natural will lay 28 miles of 12-in. pipe to a junction with its main line between Enid and Crescent, Okla. To increase capacity of the main line, Oklahoma Natural recently took up 18 miles of 8-in. south of Enid and replaced it with 12-in. pipe.

***FILLING THE FIRST.**—Shown here is the first tank car to be loaded with liquefied petroleum gas and shipped from the Snyder, Tex., natural-gasoline plant operated by Sunray Oil Corp. for 35 participating companies and individuals. Watching the loading of the initial L.P.G. car are Harold W. Manley, left, Sunray vice president, and E. J. Mills, plant superintendent. Loader is J. D. Richardson. Details of the Snyder plant operations may be found in an engineering article published in the April 19 issue of the Journal, page 174.*

Whether your cooling tower is new or old—natural or induced draft—let a qualified Fluor Service Representative study your maintenance and repair problems—at no cost to you!

**2 FREE SERVICES AVAILABLE**

1 PREVENTATIVE MAINTENANCE — Fluor will recommend a preventative maintenance program based on operating conditions and locale—and then arrange for periodic inspections!

2 ESTIMATES FOR REPAIR—Fluor will inspect to determine repairs necessary to bring your tower back to original design efficiency—then bid for the job competitively!

*Inquire through any Fluor Office*

THE FLUOR CORPORATION, LTD.
2500 SOUTH ATLANTIC BLVD., LOS ANGELES 22, CALIF.
*offices in*
NEW YORK • CHICAGO • TULSA • HOUSTON • SAN FRANCISCO

**RADIATOR TROUBLE??**

***Prevent* and *Remove* Scale and Corrosion in Radiators and Blocks — with**

**MEMPO**

Mempo is a Sodium Manganese Zinc Poly Phosphate, and it is an excellent corrosion inhibitor. It is absolutely harmless to the hands and body. It will not injure metal or rubber at any concentration. There can be no harmful effects or after effects from the use of Mempo. And it contains a lubricant for carbon sealed water pumps.

Mempo also prevents rust and scale in Waterlines, Treators, Cooling Towers.

**Send TODAY for full information**

**Metallic Phosphate Products Co.**
**1609 Azalea Drive - Alhambra, Calif.**


# REFINING

## Cities Service Oil's East Chicago Plant Strikebound

EAST CHICAGO, Ind.—Cities Service Oil Co.'s big refinery here began shutting down last week after 550 union workers were called out on strike.

The union and the management agreed on a general-wage increase of 3.8 per cent of the January 1950 base-pay rate, but negotiations bogged down when the union insisted that the company give up its right to assign overtime work "as needed."

L. E. Taylor, plant manager, said that without this company prerogative, the refinery might be unable to cope with an emergency if one should arise. Also that a worker could walk off his job at the end of his regular shift whether or not his relief had reported.

Taylor said the proposed pay hike would have been retroactive to March 1, 1951, and would have kept rates of pay in line with the general pattern of refinery wages in the area.

## Bell Platforming Unit Completed at Grandfield

GRANDFIELD, Okla.—Bell Oil & Gas Co.'s new 1,500-bbl. per day Platforming unit has been placed on stream at the company's refinery here, it has been announced by M. L. Freese, vice president.

Bell is the first plant in Oklahoma to manufacture and market platformed gasoline. The first shipment was delivered recently, and the gasoline is now being delivered to company dealers throughout the Southwest.

The company now has in the planning stage a cracking furnace for three-coil cracking operation.

## Esso, I.P.W. Agreement Averts Bayway Strike

ELIZABETH, N. J.—A strike which would have tied up Esso Standard Oil Co.'s huge Bayway refinery was averted last week when management and the Independent Petroleum Workers Union agreed on a new 2-year contract.

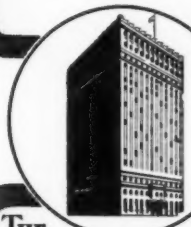
Russell K. Dutcher, president of I.P.W., said a majority of the 3,300-man membership o.k.'d the agreement which was worked out in mediation sessions with the New Jersey mediation board.

Dutcher said the company agreed to arbitrate discharges and job ratings, make grievance settlements retroactive where monetary loss was involved, and consider other union demands at future bargaining sessions.

Company and union officials were

*FIRST OF ITS KIND.—Foundation for the first Orthoflow fluid catalytic cracking unit, now under construction at Cities Service Oil Co.'s refinery at Ponca City, Okla., has been completed (lower right to rear of partly completed control house). The cracker will process 8,300 bbl. per day upon its completion by M. W. Kellogg Co.*

*Business in*
**TULSA**
*means—*



THE
**MAYO**
★ Air Conditioned ★ Centrally located ★ Adjoining Garage ★ Coffee Shop
*The Oil Man's Hotel in The Oil Capitol of The World*

**OIL AND GAS BURNING EQUIPMENT for**
**PETROLEUM REFINERIES**
Detailed Information Gladly Sent Upon Request
***CHEMICAL-PETROLEUM DIV.***
**NATIONAL AIROIL BURNER COMPANY INC.**
**1236 E. Sedgley Ave., Philadelphia 34, Pa.**
Southwestern Division: 2512 So. Blvd., Houston 6, Tex.

**"GUNITE" CONCRETE**
(SINCE 1915)
**LININGS FOR**
BUBBLE TOWERS • SETTLERS • STILLS • SEPARATORS • TANKS • AND VESSELS OF ALL TYPES • ENCASING AND FIREPROOFING STRUCTURAL STEEL AND PIPE • LINING WATER RESERVOIRS, DITCHES, DRAINS, AND CANALS • REPAIRING DISINTEGRATED CONCRETE AND OTHER MASONRY.
See our catalog in Sweet's
**GUNITE CONCRETE & CONST. CO.**
1301 Woodswether Road, Kansas City 6, Mo.
DISTRICT BRANCH OFFICES
S. T. Burton Co., 228 N. LaSalle St., Chicago 1, Ill.
George R. Lewis Co., 2036 Queen Avenue S., Minneapolis 5, Minn.
B. H. Mueller Co., 6625 Delmar Blvd., St. Louis 5, Mo.
Ole K. Olsen Co., 823 Perdido St., New Orleans, La.
Philip D. Barnard, 2036 Addison, Houston 5, Tex.
Western Steel Prod. Co., 1735 W. 13th Ave., Denver 4, Colo.

to negotiate on a settlement of a similar dispute at Esso's Bayonne refinery. It was expected that a settlement on the Bayway order will be effected. Bayonne issues are not so numerous, but major differences are essentially the same in both cases.

At Bayway, the union wanted Esso to stop hiring outside firms for specialized jobs, to arbitrate all issues, eliminate a no-strike, no-lockout clause, and temporary shift schedules, and to institute double time and a half holiday pay for shift workers.

## Firm Seeks Funds for New Petro-Chem Plant

WASHINGTON. — National Distillers Products Corp., New York, has asked Securities and Exchange Commission approval of the proposed public sale of 500,000 shares of $100 par value cumulative preferred stock.

Part of the proceeds of the financing will be applied to the prepayment of outstanding short-term bank loans and the balance will be added to the general funds of the company, which plans extensive construction expenditures including $11,200,000 in expansion of the plant of the National Petro-Chemicals Corp.

National Petro-Chemicals was organized last June for the purpose of constructing and operating plants in Illinois, in the vicinity of the junction of the natural-gas pipe-line systems of Panhandle Eastern Pipe Line Co. and Trunkline Gas Co., for the extraction of ethane, propane, butane, and other hydrocarbons from natural gas, the fractionation of these hydrocarbons, and the manufacture of ethyl alcohol, ethyl chloride, and other products from ethane.

The estimated cost of the plants is $32,000,000, including the cost of land, and working capital requirements are estimated at $2,000,000. It is contemplated that National Distillers will invest approximately $11,200,000 and Panhandle $5,800,000 in the capital stock of Petro-Chemicals on a 60-40 basis, and that the remaining $17,000,000 will be obtained under credit agreements with banks.

## Wilcox Contracts for New $1,500,000 Platformer

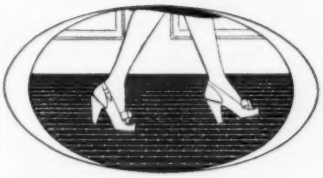
Wilcox Oil Co., Tulsa, has awarded contract to Procon Corp. for construction of a $1,500,000 Platforming unit at Wilcox's Bristow, Okla., refinery.

Construction will begin within 30 to 50 days, and the unit will go on stream in about a year.

The new unit will enable the Bristow plant to upgrade gasoline octane ratings to 95 or better and to produce critically needed aromatics.

The refinery now has a capacity of approximately 5,500 bbl. per day.

**THE SAFE OPEN STEEL FLOORING IS TRI-LOK**

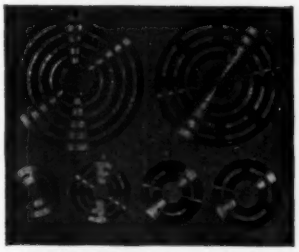


No object over ½ square inch can pass through super-safe U-Type Tri-Lok Flooring. It is unsurpassed for plant installation, walkways, loading platforms. Maximum strength, air and light with minimum weight. Efficient distribution of concentrated loads. Write for Bulletin ML 1140.

The Tri-Lok Company is also equipped to furnish *riveted* and Tri-Forge *welded* open steel flooring. Tri-Lok can be furnished in a variety of metals, including aluminum alloy, stainless steel, etc.

**DRAVO CORPORATION**
National Distributor for the **Tri-Lok Company**
**Dravo Bldg., Pittsburgh 22, Pa.**
Sales Representatives in Principal Cities

**VOSS VALVE PLATES and DISCS FOR COMPRESSORS**
INDIVIDUALLY CUT AND GROUND
ANY DESIGN ANY SIZE



***MACHINED—not punched out***
—which prevents cracks and strains thus eliminating breakage risk of fragments of broken plates getting in cylinders. Best obtainable alloy steels used to meet requirements. Oil hardened and tempered to correct hardness. Precision ground to perfect flatness.

*Let VOSS make your next Plates or Discs!*

**J. H. H. VOSS CO., Inc.**
785 East 144th Street NEW YORK 54, N. Y.

**Bestolife Lead Seal Tool Joint and Casing Compound gives maximum joint make-up, which means a *tight* seal — and easy separation of parts, which means faster handling without danger to joints. Standard of the oil country for more than 20 years. Unconditionally guaranteed. Packed in 1 ¼, 5, 20 and 50 lb. containers. Sold and exported by supply houses throughout the world.**

**I. H. GRANCELL**
1601 EAST NADEAU STREET
LOS ANGELES 1, CALIFORNIA

**VARCO**

**TUBING CLAMP**

A safety device as well as a universal set of slips, capable of handling tubing, bailers, and small drill collars. Of 2⅜", 2⅞", 3½", 4", and 4½" O.D. Self-aligning inserts with VARCO buttons facilitates maximum gripping surface. Complete within itself. Chrome alloy heat-treated steel.

*Abegg & Reinhold Co.*

**2533 EAST 26TH STREET**
**LOS ANGELES 58, CALIFORNIA**

**Houston 10, Texas; Oklahoma City 9; Odessa, Texas; New Orleans 19, La.; Shreveport, La.; Mt. Vernon, Ill.; Casper, Wyo.; Edmonton, Canada. Export: 617 So. Olive Street, Los Angeles 14, Calif.**


# Among the Drilling Contractors

## Olson Dissolves Drilling Company

Dissolution of the Olson Drilling Co., one of the larger drilling contracting organizations in the Southwest, has been announced by Arthur O. Olson, Tulsa, its president. Olson stated that he would continue the contracting business of the company as an individual, operating under the former company's name, with no change in field personnel or that company's policies.

At the same time, it was confirmed that producing properties formerly owned by Olson Drilling Co. and held by Boyd, Hardey & Wheelock, Teague, Tex., had been acquired by San Juan Oil Co. of Dallas. These properties included approximately 140 producing wells located in Illinois, Kansas, Oklahoma and Texas.

## Lodestar Uses Large Rig For Saskatchewan Test

One of the largest rigs ever assembled in Canada is being used by Lodestar Drilling Co. of Calgary, Alta., on the deep wildcat test it is starting in the Wood Mountain area of Saskatchewan Province for Sohio Petroleum Co. and the Standard Oil Co. of Ohio. The rig, a National 125 with 1,875 hp. and an 147-ft. standard derrick, is capable of drilling to a depth of 15,000 ft.

This makes two rigs which Lodestar is running for the above operators in their extensive exploratory program recently launched in Saskatchewan Province. The other rig, a smaller assembly, is drilling near the village of Findlater, 45 miles northwest of Regina. The Wood Mountain area is 20 miles north of the international boundary. Location of the test is 12 miles southwest of the town of Wood Mountain.

Two other contractors, Palmer Drilling Co. and Taylor Drilling Co., both of Regina, are drilling for the same operators in their Saskatchewan program. Palmer has two rigs running, one near Wartime and the other near Fiske, both in the Rosetown district in the west-central part of the province. Taylor's rig is on a wildcat near Pense, 20 miles west of Regina.

## Lewis Extends Work

Will I. Lewis Drilling Co., Mount Vernon, Ill., is moving one of its rigs from the Illinois basin area to the Denver-Julesburg basin of southwestern Nebraska and northeastern Colorado. Lou Tuck, recently trans-

*On location in the townsite of Cushing, southeastern Payne County, Oklahoma, where Foster Drilling Co., Cushing, has been drilling for Blackwell Oil & Gas Co. Standing, left to right: Wilmer Smith, crewman; Herman Taylor, co-owner of Reaves Drilling Co., and another contractor in the area; Carl Whan, driller; James Kirk, crewman. Foreground: Jack Hamilton and Taylor Cook, crewmen.*

*On location in the townsite of Snyder, Scurry County, Texas, where Twin States Drilling Co., Dallas, has been drilling for Jake L. Hamon. Left to right: E. L. Porter, production superintendent for Hamon; J. W. Cunningham, toolpusher for Twin States; Lloyd W. White, A. L. Bryan (driller), and E. L. Wells, crewmen on Twin States' rig.*

ferred from Mount Vernon to Casper, Wyo., is drilling superintendent for the area.

**Rocky Mountain Drilling Co.,** Los Angeles, has contracted with Standard Oil Co. of California for drilling an 8,000-ft. test near Garrison, Millard County, Utah. The test will be designated as 1 Burbank Unit.

**Creighton Drilling Co.,** Tulsa, is starting a 5,800-ft. test for Cummings-McIntyre and others at a wildcat location in the SE SE NE 6-25n-5w, just east of Pond Creek, Grant County, northern Oklahoma.

**M. J. Delaney Co.,** Dallas, has a contract for a 9,000-ft. test to be drilled in the Teague field, Freestone County, East Central Texas, for The Texas Co. Location is for 1 Roper Unit, in the J. Lawrence Survey.

**L. B. Jackson,** Tulsa, is the contractor on a Cleveland sand test which Harry J. Schafer is starting at 1 Whistler, NW SE NW 4-13n-4e, south of the Gessman field, Lincoln County, Oklahoma.

## ACTIVE ROTARY RIGS*

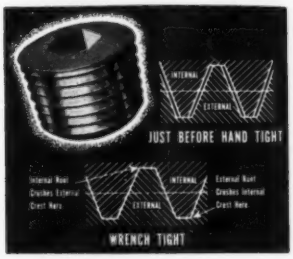
(United States and Western Canada)

| Area | Week ended 7-30-51 | Change week ended 7-23-51 | Change week ended 7-31-50 |
|---|---|---|---|
| Gulf Coast | 594 | −10 | −78 |
| W. Tex.-N. M. | 914 | 15 | −172 |
| Ark.-N. La.-E. Tex. | 164 | 0 | −8 |
| Oklahoma | 305 | +15 | −62 |
| Kansas-S. Nebraska | 174 | +15 | −44 |
| Illinois-Eastern | 154 | −12 | −13 |
| Rocky Mountains | 167 | +2 | −63 |
| Pacific Coast | 146 | −7 | −2 |
| Total United States | 2,618 | −12 | −442 |
| Western Canada | 130 | −3 | −24 |
| Total | 2,748 | −15 | −466 |

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountain and western Canada areas are shown on pages 146 and 147.


UNBRAKO®

DRYSEAL THREAD PRESSURE PLUG




SEALS TIGHT WITHOUT COMPOUND

Unique thread design of UNBRAKO "DRYSEAL" Pressure Plugs provides positive sealing of both major and minor diameters of threads, preventing spiral leakage, even under extreme pressures. Full range of sizes from 1/16" to 1¼" N.P.T.F. Write for Bulletin 675.

—SPS—

STANDARD PRESSED STEEL CO.

JENKINTOWN 25, PENNSYLVANIA

Standco

NO-SMOKE

STANDCO BRAKE LINING

For the easiest brake known. It feeds off evenly. Standco never scores brake rims. See pages 3608-3613. Composite Catalog.

Standco Brake Lining Co.

HOUSTON

Ole Gyrol says-

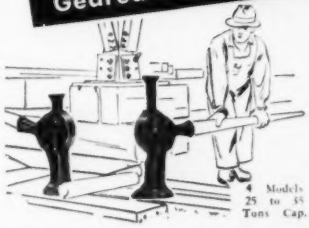
"You can pick up the string more smoothly and with greater safety with adjustable speed Gyrol Fluid Drives."

Protect your investment, save time and money — Specify American Blower Gyrol Fluid Drives on your oil drilling equipment.

AMERICAN BLOWER CORP., DETROIT 32, MICH.
CANADIAN SIROCCO CO., LTD., WINDSOR, ONT.
Division of American Radiator & Standard Sanitary Corporation

Serving home and industry
AMERICAN STANDARD • AMERICAN BLOWER
CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS
ROSS HEATER • TONAWANDA IRON

SAFER, FASTER JACKING
• ON RIG SKIDDING
• MACHINE MOVING
• IN CONSTRUCTION
with SIMPLEX Geared Jacks




Designed for heavy duty action, engineered to save time and money on scores of jobs. 25 ton models shown have right and left hand toe lifts, respectively, for paired operation. All furnished with oval hickory lever poles for maximum strength.

SEND FOR BULLETIN: OIL 49

Simplex
LEVER • SCREW • HYDRAULIC
Jacks

TEMPLETON, KENLY & COMPANY

1034 So. Central Avenue, Chicago 44, Illinois

# Less Time "Fishing"

## when you drill with DRISCOSE*

**THIN, STRONG SHEATH.** You get down there faster . . . and with less trouble . . . with Driscose base mud forming a protective coating in the hole. Holes are drilled nearer to bit size, too, because of reduced wetting and washing action. Less danger of cement channeling. Fewer twistoffs! And fewer ledges to complicate recovery of a "fish" in case twistoffs do occur.

**EASY TO HANDLE.** Driscose comes in 50-pound, 6-ply, water-resistant bags; is soluble in hot or cold water; may be added through ordinary hopper. No fermentation problems. You can obtain Driscose from your regular drilling mud dealer.

**LOW FLUID LOSS.** Use Driscose in aqueous or emulsion muds to reduce loss of water or oil. Helps keep total mud costs low in practically every drilling area . . . in uncontaminated and contaminated muds, also. Write us for help with your drilling problems. No obligation.

*DRISCOSE is a trademark for Sodium Carboxymethylcellulose

**DRILLING SPECIALTIES COMPANY**

BARTLESVILLE, OKLAHOMA

# Now It's Martin County

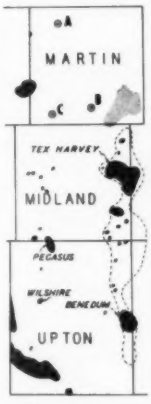
ONE by one the counties of West Texas develop exploratory interest that lifts them above the others for a time before they settle down to development and the business of producing oil. Scurry, Upton, and Midland are county names that everyone remotely connected with oil business has heard of recently—now it's Martin County that is making a strong bid for a share of West Texas' record drilling activity, currently so heavily concentrated in that portion of the Spraberry trend down the east sides of Midland and Upton counties and extending over into the southwest corner of Glasscock County and the northwest corner of Reagan County (area inside dashed line on map).

Indications of Spraberry oil within the shaded area on the map are piling up in a number of tests being drilled and completed. To the west at A, B, and C on map are wildcats that have indicated the pre-Permian potentialities of Martin County. Deep discoveries are extremely significant this far north in the Midland basin for they add materially to the growing recognition of the great possibilities offered by the older rocks throughout the basin area.

At A is Pan American Production Co. et al 1 Breedlove, which was recently completed for an official potential of 2,341 bbl. of 41.3°-gravity oil on the basis of a 6-hour test through a ¾-in. choke from Devonian rocks at 12,078-12,118 ft. A northeast offset to this important discovery has been staked.

The 1 Breedlove was the first significant Devonian producer in Martin County. The Texas Co. 1-X State, about 8 miles to the southwest, Martin County's only 1950 discovery, was originally completed in the Ellenburger at 13,275-13,300 ft. but was soon plugged back for completion in the Devonian at 12,280-95 ft. from which it is still producing a small amount of oil.

At B is Tide Water Associated Oil Co. 1 Dickenson, which topped the Ellenburger at 12,090 ft. and was drilled on to 12,140 ft. A drill-stem test at 12,090-12,115 ft. recovered 2,435 ft. of 51°-gravity oil in 3 hours. Following a drill-stem test at 12,098-12-140 ft., which flowed 9 bbl. of oil in 30 minutes after tester had been open over 6 hours, salt water was found in the pipe. Casing is being run at this indicated discovery for further testing. This wildcat had questionable commercial production possibilities in a thin Devonian section at 11,740-80 ft. and interesting shows in the Spraberry where attempts to bring the well into production failed.




At C is a new producing area in southwestern Martin County which is undergoing development. Spraberry sand production was established here in February, a Pennsylvanian discovery was completed in April, and a Silurian discovery (in the Pennsylvanian-discovery well) has recently been assured.

First discovery was Gulf Oil Corp. 1-E Glass "B" which was completed flowing 100 bbl. of 38°-gravity oil per day through a 5/16-in. choke at 8,725-80 ft. in the Spraberry. This well had been drilled about 150 ft. into the Ellenburger topped at 12,770 ft. with no encouragement encountered in the deeper rocks.

Gulf 2-E Glass "B," a northeast offset to the Spraberry discovery well, flowed 552 bbl. of 49°-gravity oil per day through ½-in. choke from acidized Pennsylvanian rocks at 10,450-10,530 ft. Then from perforations at 12,100-80 ft. opposite Silurian rocks, the well flowed 317 bbl. of oil through a ⅜-in. choke in 21 hours.

The three West Texas counties shown on the sketch map run north-south through the deepest portion of the Midland basin. Since the discovery of deep pre-Permian oil at Big Lake in Reagan County back in 1928 the search for Ellenburger oil in the Midland basin has been rewarded by several big, multipay fields. Though evaluation of the area's deep discoveries on the basis of the initial performance of one well has been found unadvisable, the recent developments in Martin County are very encouraging.

In this connection the new deeper Wilshire field in Upton County *(see The Oil and Gas Journal, March 29, page 363)* seems to be living up to expectations. This deep field, opened a few months ago by Sinclair Oil & Gas Co., now has three big Ellenburger producers and a fourth apparently assured. This field, which also has Pennsylvania production, is scheduled for considerable development.

*Philip C. Ingalls.*

## HIGHLIGHTS OF WEEK'S DEVELOPMENTS

**ROCKY MOUNTAIN AREA.**—Carter Oil Co. and Continental Oil Co. have a new discovery in the Duchesne area, Utah, with the well flowing 14 bbl. of oil per hour. Shell Oil Co. is deepening the Richey area, Montana, discovery after the well flowed on tests of the zone 7,133-7,266 ft. The operator plans to deepen through the producing formation, tentatively identified as Mississippian-Charles.

**WEST TEXAS.**—Imperial Production Co. 1 Cox, Scurry County wildcat, flowed 18-20 bbl. of oil an hour from Pennsylvanian reef at 7,130-42 ft. Location is 3 miles west and separated by dry holes from Cogdell producers. Spraberry oil moved 5 miles east along southern border of Glasscock County as Paul Barnhart 1-10 Bibgy kicked off and flowed 20-30 bbl. of oil hourly from 6,710-6,908 ft.

**SOUTH LOUISIANA.**—A new field has been opened 1⅛ miles southwest of South Bayou Mallet field, Acadia Parish, at Bates and Cornell 1 Mrs. Lawrence E. Frey, 31-7s-1e. The well flowed 210 bbl. of oil daily through perforations at 9,438-46 ft.

*Order*

**IDECO Pumping Units through these Distributors**

THE AMERICAN PIPE AND SUPPLY COMPANY
Casper, Wyoming

THE BOVAIRD SUPPLY CO.
Tulsa, Oklahoma

DOMINION OILFIELDS SUPPLY CO., LTD.
Calgary, Alberta, Canada

HOUSTON OIL FIELD MATERIAL COMPANY, INC.
Houston, Texas

IVERSON SUPPLY COMPANY
Tulsa, Oklahoma

JARECKI-INTERNATIONAL SUPPLY DIVISION
Dallas, Texas

MID-CONTINENT SUPPLY COMPANY
Fort Worth, Texas

MOUNTAIN IRON AND SUPPLY CO.
Wichita, Kansas

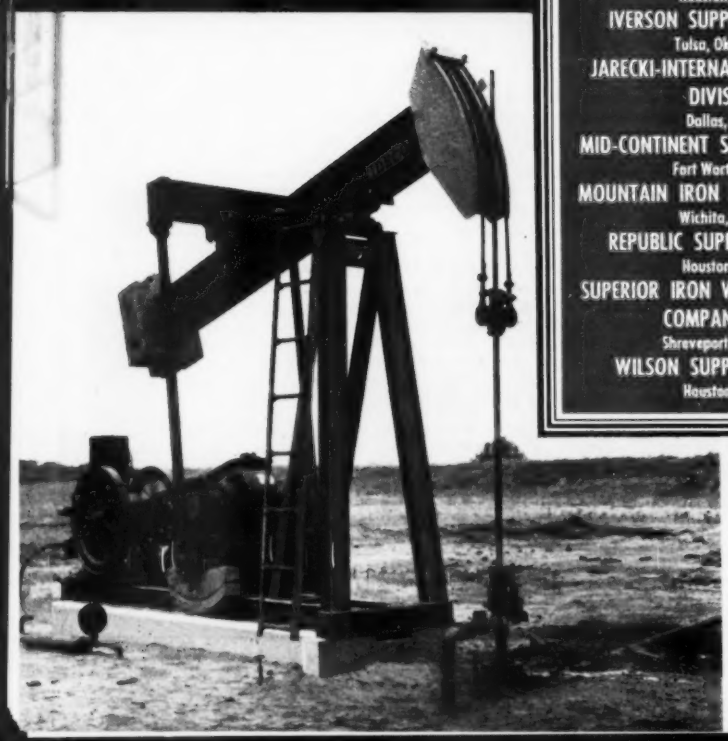
REPUBLIC SUPPLY COMPANY
Houston, Texas

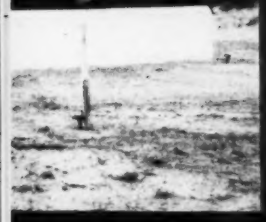
SUPERIOR IRON WORKS & SUPPLY COMPANY, INC.
Shreveport, Louisiana

WILSON SUPPLY COMPANY
Houston, Texas

*"Field Proved" Performance*

*...Plus Lowe*





ifting Cost

# IDECO offers you a wide range of A.P.I. Pumping Units... with these outstanding features:

- WHEEL-TYPE CRANKS
- VARIABLE WEIGHT COUNTERBALANCES
- RIGID FOUR-LEGGED SAMSON POSTS
- SELF-ALIGNING WRIST PIN BEARINGS
- FORGED STEEL GEARS
- ALL ROLLER BEARING CONSTRUCTION
- FLOOR CLEARING MODELS
- MAGNETIC OIL SAVER*
- HERRINGBONE GEARS
- FIELD PROVED DESIGN

*PATENT PENDING

**IDECO — A DIVISION OF DRESSER EQUIPMENT COMPANY**

HEADQUARTERS: Dallas, Texas.

PLANTS: Beaumont, Texas; Columbus and Delaware, Ohio; Torrance, California.

EXPORT OFFICES: Dallas, Texas; New York City; Torrance, California. Argentina—Buenos Aires; Brazil—Rio de Janeiro; Colombia—Barranquilla; England—London; France—Paris; Italy—Somma Lombardo, Varese; Turkey—Ankara, Istanbul; Venezuela—Caracas, Maracaibo.

**IDECO**

ONE OF THE DRESSER INDUSTRIES

# Rocky Mountain

## Uintah Basin Gets Fourth Basal Green River Strike

DENVER—The fourth basal Green River fractured-shale discovery for the Uintah basin has been completed by Carter Oil Co. and Continental Oil Co. this week. The well is 1 Ute-Tribal, C SE NE 17-4s-4w, in the Duchesne area, Duchesne County, Utah, 35 miles southwest of Roosevelt, the closest producing field.

The well flowed 14 bbl. of oil per hour on tests this week and is still cleaning up. However, only a small amount of mud was recovered on the tests. This oil is 42° gravity, with a pour point of 100°, which is higher than other oil produced in the region. The high-pour-point oil in all fields of the region involves complicated and expensive problems unique to the area. Carter-Continental have run a heating string in the annular space to 3,916 ft. and circulate hot oil while producing. Production is from the zone 7,486-7,596 ft.

Wildcat drilling is prevalent throughout the entire basin with eight wildcats or stepout wells now under way.

It is reported from Montana that Shell Oil Co. is taking a 20-ft. core at the important Richey wildcat in Dawson County. The well is 1 Northern Pacific, SE NW NW 19-23n-59e, on the west side of the Williston basin. The well flowed oil at the rate of 50-100 bbl. per hour on initial tests last week, but production dropped as the well was not swabbed and cleaned prior to initial testing. Shell has not announced formation tops on the wildcat, but production is now believed to be from upper Mississippian—probably Charles formation. Initial production was from the zone 7,183-7,266 ft., total depth, and the operator is reported planning to core and test at intervals through the formation. Following this deepening the well may be acidized, although the operator has announced no plans for this work.

Shell is drilling below 4,800 ft. at 1 Pine Unit, SW SW NE 30-12n-57e, Wibaux County, southeast of the Richey wildcat and along the axis of the Baker-Glendive anticline. The Texas Co. is also drilling in this general area with 1 Northern Pacific, C NE NE 35-15n-54e, between the two Shell wildcats. The Texas well is below 4,100 ft.

Across the line in North Dakota, Amerada Petroleum Corp. last week completed the first commercial discovery in the basin, with 1 Iverson, C SW SW 6-155n-95w, Beaver Lodge, Williams County, flowing an initial of 12 bbl. of 39°-gravity oil per hour from the zone 10,490-10,530 ft., possibly in Devonian. Amerada is drilling two new wildcats along the long Nesson anticline, and has made location for another well in the Beaver Lodge area.

These discoveries have greatly intensified the leasing campaign throughout the Williston basin, with leasing now extending westward into the Blood Creek basin area of central Montana and into the Powder River basin joining the Williston basin in the east-central part of the state. More than 300 lease brokers have been reported working throughout the region. Stanolind Oil & Gas Co., Sun Oil Co., Sinclair Oil & Gas Co., Phillips Petroleum Co., Amerada Petroleum Corp., and others are reported having large lease spreads throughout this region.

### WYOMING WILDCAT FAILURES

Campbell County, Rozet: Delta Drilling Co.-Hancock Oil Co. 1 Lyle-Govt.; C NE NW 6-48n-69w; TD 7,935 ft.; dry. Muddy 7,310 ft., Muddy sand 7,332-34 ft., Dakota 7,544-7,602 ft., Lakota 7,652-81 ft., Morrison 7,681 ft., Sundance 7,904-24 ft.

Natrona County: Fish Creek: Atlantic Refining Co. 3 Govt.; SE NW NE 8-31n-84w; TD 1,572 ft.; dry. Muddy 1,027 ft., Thermopolis 1,073 ft., Dakota 1,237 ft., Lakota 1,305 ft., Morrison 1,357 ft., Nugget 1,502 ft.

### MONTANA WILDCAT FAILURE

Fergus County, Crooked Creek: Amerada Petroleum Corp. 1 Lester Pestol, C NW SE 17-18n-24e; TD 6,468 ft.; dry. Eagle Creek 1,806 ft., first Cat Creek 3,743 ft., Kootenai 3,823 ft., second Cat Creek 3,948 ft., third Cat Creek 4,070 ft., Charles 4,523 ft., Mission Canyon 4,799 ft., Lodgepole 5,240 ft., Devonian 5,890 ft., Cambrian 6,350 ft.

### NORTHERN NEW MEXICO WILDCAT FAILURE

San Juan County: British-American Oil Producing Co. 1 M. J. Salge, NE SW SW 3-25n-13w; TD 1,446 ft., dry.

### WESTERN NEBRASKA WILDCAT FAILURES

Garden County, South Lisco: Brown Drilling Co. 1 Rushland, NW NW SW 30-16n-45w; TD 4,195 ft.; dry. Niobrara 3,011 ft., Fort Hays 3,287-3,324 ft., Carlile 3,392 ft., Codell 3,382-95 ft., Greenhorn 3,558 ft., Graneros 3,592 ft., "D" Muddy 3,778 ft., "G" Upper Muddy shale 3,859 ft., "J" sand 3,812 ft., Skull Creek 3,993 ft., Lakota 4,155 ft.

Kimball County, Dix area: Olds Oil Co. 1 fee, NE NE NW 9-14n-53w; TD 6,040 ft.; dry. Niobrara 4,646 ft., Fort Hays 4,876 ft., Codell 4,982 ft., Greenhorn 5,166 ft., first sand 5,445 ft., Muddy 5,570 ft., Morrison 5,999 ft.

### NORTH DAKOTA WILDCAT SUCCESS

Williams County, Beaver Lodge: Amerada Petroleum Corp. 1 Clarence Iverson, C SW SW 6-155n-95w; TD 11,955 ft.; flowed 12 bbl. oil per hour, 39° gravity, plus 290 M.c.f. gas per day. Newcastle 4,336 ft., Skull Creek 4,363 ft., Dakota 4,614 ft., Morrison 4,994 ft., Ellis 5,187 ft., Spearfish 5,990 ft., Amsden 6,810 ft., Big Snowy 7,010 ft. (sample) Otter 7,160 ft., Kibbey-Charles 7,555 ft., Madison 8,295 ft., Kinderhook 9,820 ft., Three Forks (Devonian) 9,922 ft., Jefferson 10,110 ft.

THE PIONEER OF
SELF-MOTIVATED SEPARATORS

- PROVEN PERFORMANCE
- ECONOMICAL OPERATION
- SAVES DRILLING COSTS

No drilling outfit should be without a Thompson Shale Separator and Sample Machine. The Thompson Separator does a twofold job: (1) it removes the shale and abrasives from valuable drilling mud, and (2) the amazingly accurate SAMPLE MACHINE collects cuttings all the time the separator is operating to give an accurate foot-by-foot analysis of the progress of the well. The value and accuracy of the Sample Machine is recognized by drilling and geologic authorities as the best method of obtaining samples.

Try THOMPSON, You'll See . . .

SOLD THROUGH SUPPLY STORES EVERYWHERE!

THOMPSON TOOL CO.

IOWA PARK, TEXAS

## Kansas

### Gove County Wildcat Produces on Tests

SWABBING tests at Glenn Nye Drilling Co. 1 Lundgreen, NW NW NW 29-14-29, which promises to open Gove County's second oil pool, made 4½ bbl. of oil per hour. The prospective discovery well, located 3 miles southwest of the Coberly pool, the county's first pool, opened last June by Cities Service Oil Co., is testing open hole at 4,279-88 ft. in the Mississippian, topped at 4,262 ft. (—1,673 ft.). The Coberly discovery, and so far only well in that pool, produces from the Pennsylvanian Marmaton lime.

Kingwood Oil Co. 1 Folkerts, SE SE SE 21-21-23, prospective discovery well in Hodgeman County, swabbed 13 bbl. of oil per hour for 4 hours in starting tests of the Marmaton zone at 4,302-22 ft. In previous tests of the Mississippian, it made 8 bbl. of oil and 36 bbl. of water during a 12-hour period. Mississippian tests were from open hole at 4,531-64 ft. Marmaton tests are through casing perforations with bottom of the casing at 4,531 ft. The prospective pool, located 8½ miles northeast of Jetmore, will be the third for the county. It is 7 miles northeast of the Jetmore pool, the county's first pool, opened a year ago.

The small gap betwesn the north end of the Dayton pool and the southwest side of the Huffstutter pool in Phillips County is being further narrowed by a prospective well at Lewis Drilling Co. 1 Kelly, NE NE SE 23-2-19. The well, located a mile north of the former pool and ¾ mile southwest of the latter, swabbed an average of 3 bbl. of oil per hour while testing the Lansing-Kansas City pay zone of those fields. Casing is perforated at 3,458-62 ft. Total depth is 3,568 ft. with bottom of the casing at 3,522 ft. Top of the Lansing is 3,291 ft. (—1,098 ft.).

Indications of a new pool located 1½ miles south of the Brock pool, Stafford County, have been given by showings found by Carl Todd Drilling Co. at its 1 Wendelburg, SE SW NE 19-23-11. Best showings were in Arbuckle lime, topped at 3,728 ft. (—1,904 ft.), in which a 30-minute drill-stem test at 3,729-32 ft. filled 240 ft. of clean oil and 10 ft. of oily mud. A drill-stem test at 3,520-37 ft. in the Lansing-Kansas City zone yielded 45 ft. of heavily oil-cut mud. Casing has been run to 3,729 ft., 1 ft. in the Arbuckle, for completion.

Exploration in far-western Kansas is being extended to Greeley County, bordering Colorado, where Duncan Drilling Co. and C. B. Wiley of Big Spring, Tex., are starting a test at 1 Seil, C SW SE 28-18-42. The location is 4½ miles east of the Colorado line and 45 miles from nearest production, the small Patterson pool, northwest of the Hugoton gas area, in Kearny County. Only two tests, both dry, have ever been drilled in the county.

#### KANSAS SUCCESSFUL WILDCATS

Barton County: Todd 1 Sanford, SW NW NW 25-17s-14w, pumped 433 bbl. oil from Arbuckle at 3,375-94 ft., TD.

Hartman 1 Pohlman, SW SE SW 30-19s-11w, pumped 50 bbl. oil from Arbuckle at 3,347-51 ft., TD.

Petroleum, Inc. 1 Rathbun, NW NW NE 9-17s-13w, pumped 160 bbl. oil from Arbuckle at 3,359-63 ft., TD; old dry hole worked over, zone discovery in Shoo Fly.

Ellis County: Lion 1 Herl, NW NW SE 25-14s-17w, pumped 133 bbl. oil from Arbuckle at 3,478-88 ft., TD.

Kingman County: Bankoff 1 Cathy (Diffenbacher (?), SW SW SW 22-27s-5w, flowed 28 bbl. oil from Mississippian at 3,802-19 ft., TD.

Phillips County: National Associated Petroleum 1 Stevens, NW NE NE 21-1s-18w,


ALTEN has all 3

LONGEST STROKES

HIGHEST GEAR REDUCER RATINGS

Plus HARDEST GEAR SURFACES

Every Alten Pumping Unit will positively perform to its full rated capacity.

ALTEN

THE WORLDS BEST PETROLEUM EQUIPMENT

Polished Rod Clamp

Whether your next equipment purchase is a giant pumping unit or a small polished rod clamp, ask for Alten at your supply store.

You'll get more for your money right from the start because Alten equipment is sensibly priced. You get more for your money through the years because Alten equipment has added engineering advantages to assure top performance and long life.

Stubby Tubing Head

Polished Rod

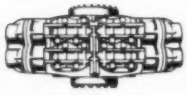
Stop Cock

ALTENS FOUNDRY & MACHINE WORKS INC.
LANCASTER, OHIO

# ONLY SHAFFER HYDRAULIC CELLAR CONTROL GATES PROVIDE ALL THESE vital advantages

### Space-Saving Compactness

Even in sizes as large as 13⅜" (12" Series 900), the Shaffer Hydraulic Double Cellar Control Gate provides two compartments unitized into one body in an overall height of only 30". In a Shaffer Hydraulic Single Gate of the same size only 18½" is required.



### Completely Enclosed Design

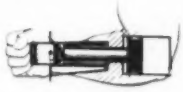
All moving parts—even the piston rod ram shafts—are completely enclosed within the body of the Gate. There is nothing to become wedged or damaged by objects falling into the cellar—nothing to become corroded by chemical or salt-mud drippings. Even the locking shaft is non-rising—fully protected!

### Simple Ram Changes

Just unbolt and swing open a side door, slide out the ram assembly, slide in the new assembly, close and bolt the door. It's by far the simplest ram change in any control gate—and complete ram changes can be made whether the pipe is in or out of the hole!

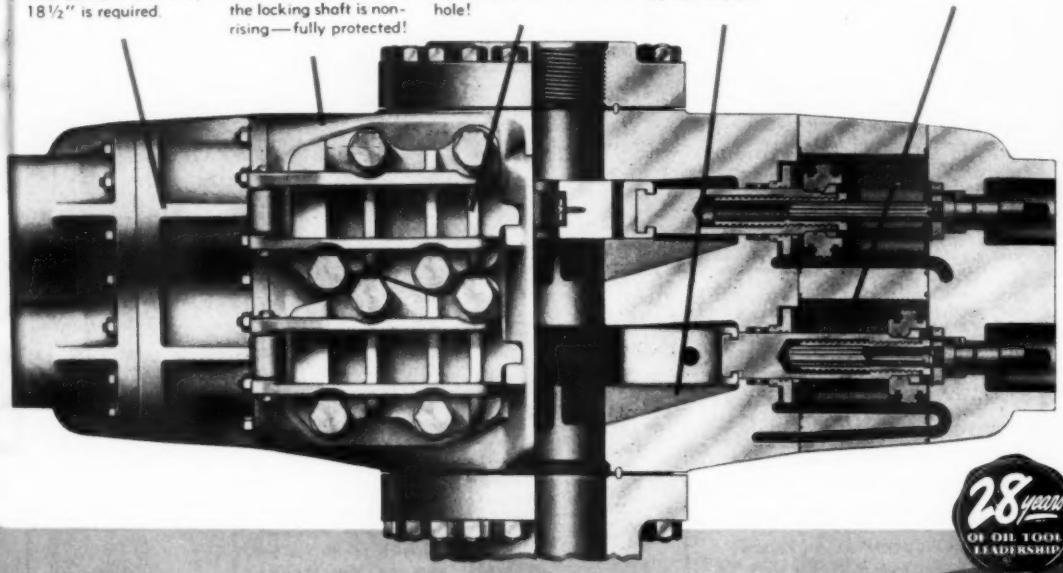
### Self Draining Construction

Note how the rams travel on high narrow guide ribs above the steeply-sloped bottoms of the ram compartments. Mud and sand quickly drain back into the well—leaving no detrimental accumulations to interfere with free ram travel!



### Direct Hydraulic Drive

Note how the hydraulic operating cylinders are directly behind the rams for positive action, maximum simplicity, greatest safety. There are no complex mechanisms, no yokes, no secondary connections between hydraulic cylinders and rams!



**Think of it**—no other hydraulic gate matches Shaffer on even one of these salient features. Yet Shaffer gives you *all* these—and more. No wonder operators everywhere are so enthusiastic about Shaffer equipment. And remember—Shaffer not only provides Hydraulic Cellar Control Gates in both Double (illustrated above) and Single types . . . but is the only manufacturer also providing a complete selection of *Mechanical* Cellar Control Gates—both Double and Single types—for those installations where this type of operation is preferred!

**See your nearest Shaffer representative for complete details on Shaffer Cellar Control Gates. Or write for free copy of 1951 Shaffer Catalog!**

28 years OF OIL TOOL LEADERSHIP

# SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th Street
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

**See the Shaffer section—pages 4525 to 4600—of your 1951 Composite Catalog!**

pumped 169 bbl. oil from 3,382-88 ft. and 3,398-3,404 ft., TD 3,482 ft.

Stafford County: Anschultz 1 Sittner, SE NE SW 4-22s-12w, 303 bbl. oil from Arbuckle at 3,648-52 ft., TD.

### KANSAS WILDCAT FAILURES

Barton County: Phillips 1 Tucker, SW SW NE 33-20s-13w, dry, TD 3,609 ft.

Butler County: Gaty 1 Entz, NE SE SE 31-24s-3e, dry, TD 2,800 ft.

Cowley County: Wakefield et al 1 Briscoe, SW NW NW 17-32s-6e, dry, TD 3,130 ft.

Decatur County: Gore 1 Nauer, SW SW SW 27-4s-26w, dry, TD 4,055 ft.

Graham County: Keating 1 Kirtley, NE NW SW 4-8s-21w, dry, TD 3,645 ft.

Barnett 1 Justus, NE NE NE 22-9s-22w, dry, TD 3,975 ft.

Francis 1 Faulkner, NE NE SW 14-10s-22w, dry, TD 3,970 ft.

Marion County: Waggoner 1 Johnsmeyer, SE SE NE 17-20s-4e, dry, TD 2,524 ft.

Ness County: Wedell et al 1 Pemeler, SE SE SE 3-19s-26w, dry, TD 4,651 ft.

Pottawatomie County: Lincoln 1 Umscheid, SE SW NW 16-9s-9e, dry, TD 1,961 ft.

Reno County: Wentworth et al 1 Stuckey, SW SW SW 20-25s-5w, dry, TD 4,035 ft.

Rooks County: Isern 1 Holl, NE NE SE 9-9s-18w, dry, TD 3,660 ft.

Trego County: Davis 1 Faulkner, NW NW SW 4-11s-22w, dry, TD 4,004 ft.

Jones-Shelburne & Farmer 1 Harrison, SWSW SW 2-12s-22w, dry, TD 4,110 ft.

### EASTERN NEBRASKA WILDCAT FAILURES

Blaine County: Kingwood 1 Spencer, C NE NE 22-24n-21w, dry, TD 3,368 (?) ft.

Burt County: Griffith 1 Erickson, NW NW NW 25-21n-9e, dry, TD 2,062 ft.

## California

### Fewer July Drill Notices Indicate Pipe Shortage

LOS ANGELES — Based on the number of notices to drill being filed with the Division of Oil and Gas, it appears shortages of tubular goods have progressed to the point where operators are being forced to curtail their California drilling programs.

At the first of June when the Conservation Committee prepared an estimate of drilling for the third quarter, it was shown that California operators intended to increase activity. The number of notices filed during July, however, averaged only 44 weekly; whereas in the preceding 3 months the number was running about 52 per week.

The 1 month's record does not constitute a trend but coupled with the fact there has been a decided increase in complaints regarding pipe shortages indicates the situation has grown much worse.

Exploratory activity during the week included preparations for a wildcat 2 miles northwest of the North Belridge field and the staking of two stepouts to a recent discovery in the Mountain View area in Kern County. The Belridge test, near Blackwells Corner in SW NW Section 8-27s-20e, will be The Texas Co. 1 Occidental. At Mountain View, Humble Oil & Refining Co. staked locations for ½ and ¼-mile north-extension attempts to Ring Oil Co. 1 Means, which opened Chanac-sand oil production in Section 34-30s-29e. The 1 Kirschenman will be in SW SW Section 27 while 12-34 Westberg et al will be in NW NW Section 34.

In the Castaic-Newhall area of Los Angeles County, Continental Oil Co. has staked a wildcat 3 miles northwest of Honor Rancho production. A joint test with State Exploration Co., it will be 1 Alexander in NE SW Section 23-3n-17w. About 15 miles north of Castaic, in SW Section 20-7n-17w, Continental also has staked location for a second wildcat, 1 Elbe-USL.

Southeast of the Honor Rancho field about 2½ miles Humble Oil & Refining Co. has resumed activity at its recently suspended D-1 Newhall Land & Farming Co. in Section 9-4n-16w. Drilled to a total depth of 8,766 ft. with surface casing set at 1,235 ft., pumping tests were being made of shallow showings after the pipe had been perforated. Humble has staked location for D-2 N. L. & F. about 100 ft. north and 500 ft. east of D-1.

In Cuyama Valley, Richfield Oil Co. 64-14 Joice-B was coring ahead below 5,500 ft. after a formation test at 4,731-4,923 ft. yielded 240 ft. of gassy mud and traces of oil. Located in Section 14-11n-28w, the wildcat is less than ¼ mile northeast of R. B. Watkins 1 Luce. Extensive testing was done in the latter in an effort to establish production from the Dibblee sand topped at 4,561 ft. The current test is about midway between Russell Ranch and Morales Canyon fields.

### CALIFORNIA UNSUCCESSFUL WILDCATS

Fresno County, Raisin City area: Long & Bell 2-19 "Well," 19-15s-18e, dry, TD 5,351 ft., elev. 205 ft.

Kern County, Mount Poso area: Riokern Oil Co. 2 SP, 3-27s-28e, dry, TD 864 ft., elev. 1,230 ft.

Ferguson & Bosworth 1 Glide, 31-27s-28e, dry, Vedder 2,640 ft., TD 2,673 ft., elev. 865 ft.

Salt Creek area: British American-Western Gulf Oil Co. 52-A Wright-USA, 23-29s-20e, dry, bottomed in hard shale, TD 3,842 ft., elev. 1,315 ft.

Santos Creek area: Independent Exploration Co. 1 E-P USL, 4-29s-20e, dry, TD 1,891 ft., elev. 1,325 ft.

Tejon Hills area: J. K. Kosanke K-4 "Well," 14-11n-18w, dry, bottomed in Chanac, TD 605 ft., elev. 1,225 ft.

San Luis Obispo County, Carrizo Plains area: Navy Oil Co., Inc., 2 Navy, 5-11n-26w, dry, TD 2,506 ft., elev. 2,200 ft.

Santa Barbara County, Guadalupe area: Los Nietos Co. A-2 LeRoy, 14-10n-36w, dry, TD 5,045 ft., elev. 76 ft.

**Another Texas!**

That's more than a byword in Alberta, Canada—with production and prospect records following the Lone Star State's path of fame.

Just as in Texas, there are plenty of American dollars at work for progressive operators and investors.

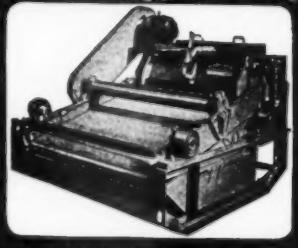
The Alberta Oil Field Offices of The Bank of Toronto offer efficient banking services and information and advice about any phase of Canada's oil industry. Write or call Mr. G. Heinrich, Manager, The Bank of Toronto, Calgary, Alberta, Canada, or I. J. Hutton, Manager, The Bank of Toronto, Edmonton, Alberta, Canada.

THE BANK OF TORONTO

*Incorporated 1855*

SECONDARY MODERN RECOVERY
TECHNICAL CONSULTING
PRODUCTION ENGINEERING
SERVICE, INCLUDING CORE ANALYSIS
PRESSURE MAINTENANCE WITH GAS OR WATER
REPRESSURING WITH GAS OR WATER
Pressure Maintenance Installation

Wichita County, Texas
New Phone No.
3-2167
Replacing 8466 and LD 66
SURVEYS
ESTIMATES
DESIGN
INSTALLATION
SUPERVISION
PETROLEUM ENGINEERS
CABLE & STINE
WICHITA FALLS, TEXAS

OVERSTROM
VIBRATING
ROTARY MUD SCREENS

OVERSTROM'S 4½'x 5' heavy duty mud screens have earned and won the acceptance of drilling operators throughout the world. The proven product of 25 years experience in designing vibrating screen equipment.
Also available in sizes 3'x 4' and 2'x 4' in single or dual units.
Write to Oil Equipment Division for bulletin MS-20-B or see Composite Catalog.
OVERSTROM & SONS
ENGINEERS AND MANUFACTURERS
2213 West Mission Road
Alhambra, California, U. S. A.

# North Central Texas

## Callahan County Wildcat Completing in Ellenburger

WICHITA FALLS.—Magnolia Petroleum Co. 1 Jackson, wildcat 5 miles north of Baird in Callahan County, was ready to complete as an Ellenburger discovery. Perforations at 4,417-33 ft. developed a flow of 141 bbl. of 43°-gravity oil in 11 hours through 18/64-in. choke. Other shows of oil were found higher in the hole.

R-G Drilling Co. 1-A Brown, Block 929 in the Buchanan Mississippian field of Throckmorton County, had prospects of a new pay zone in the Strawn sand. First test at 3,183-92 ft. recovered 120 ft. of free oil and 60 ft. of heavily oil-cut mud in 1 hour. Second test, open 30 minutes, recovered drilling mud with no shows from 3,192-3,202 ft. A south offset to the field discovery found oil at approximately the same level, and another section in the Strawn, from 3,745-55 ft., yielded 35 ft. of free oil on drill-stem test.

A second well has been completed in the Olney townsite, Archer County. T. V. Gorman 2 Kelly gaged 267 bbl. of 41°-gravity oil a day through 24/64-in. choke from pay at 3,318-25 ft. Flowing pressure was 100 psi.

In Clay County, 3 miles southwest of Buffalo Springs, Continental Oil Co. 4-C S. W. Heard, prepared to complete in the Ellenburger after flowing 50 bbl. of oil in 3 hours through ½-in. choke from pay at 6,470-90 ft.

Strawn production was extended southwest of the Wolfe field of Jack County at Paul P. Steed 3-A Nannie Ware in Block 3,350. The well had pay from 3,229-37 ft. and produced 142 bbl. of 41°-gravity oil a day on the pump.

Continental Oil Co. 1 B. L. Foster had prospects of extending Bend conglomerate production north of the Foster field in western Montague County. A 1-hour drill-stem test from 6,056-90 ft. had gas in 15 minutes and recovered 150 ft. of oil.

**NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS**

Archer County: C. E. Morrison 1 H. O. Prideaux, John Dorsey Sur., 3 mi. NW Markley, TD 4,252 ft., elev. 1,050 ft., pay 4,157 ft., IP pumped 69 bbl. a day.

Coleman County: W. O. Fortenberry 1 T. N. Evans, Sec. 47, T&NO Sur., 7½ mi. E Coleman, TD 2,556 ft., Marble Falls gas pay 2,546 ft., IP 3,300,000 cu. ft., SIP 1,063 psi.

Eastland County: Don Hill 1 J. W. Clark, 29-2-H&TC, TD 13,150 ft., pay 1,313 ft., IP 17 bbl.

Fisher County: G. E. Kadane & Sons 1 H. M. Scarbrough, Blk. 2, R. H. Hibbitt Sur., 1 mi. SW Royston, TD 5,838 ft., elev. 1,933 ft., Ellenburger 5,779 ft., IP pumped 71.5 bbl. 40°-gravity oil a day.

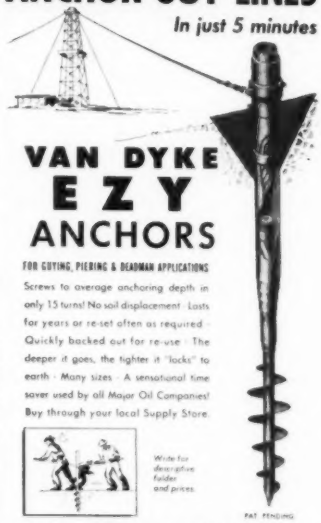
Jack County: R. H. Goble 1 W. L. McClure, A. L. Watson Sur., 10 mi. S Bryson, TD 1,941 ft., pay 1,935 ft., IP pumped 77 bbl. oil a day.

Franklin Love & Co. 1 E. M. Williams, BS&F Sur., 9 mi. SW Jacksboro, TD 4,862 ft., conglomerate pay 4,848 ft., IP flowed 117 bbl. 41°-gravity oil a day, ¼-in. choke, TP 100 psi.

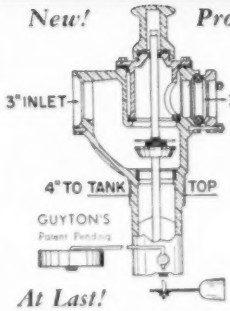
Jones County: French M. Robertson 1 F. E. Black, 41-149-DeWitt CSL, 4 mi. S Noodle, TD 5,232 ft., pay 4,612 ft., IP flowed 153 bbl. oil a day, 20/64-in. choke, TP 50 psi., GOR 520 cu. ft.

Taylor County: Southern Minerals Corp. 1 J. E. Graham, 27-1-SPRR, 2 mi. NW Ovalo, TD 4,148 ft., elev. 1,950 ft., Gardner sand 4,440 ft., IP flowed 64 bbl. 39°-gravity oil a day, ²⁄₈-in. choke, TP 25 psi, GOR 1,650 cu. ft.

Throckmorton County: Warren Oil Corp. 1 Annie Johnston, Sec. 1,643, TE&L Sur., 5½ mi. E. Woodson, TD 4,522 ft., elev. 1,225 ft., Caddo 3,688 ft., IP flowed 390 bbl. 42°-gravity oil a day, 18/64-in.

How to
ANCHOR GUY LINES
In just 5 minutes

VAN DYKE
EZY
ANCHORS
FOR GUYING, PIERING & DEADMAN APPLICATIONS
Screws to average anchoring depth in only 15 turns! No soil displacement · Lasts for years or re-set often as required · Quickly backed out for re-use · The deeper it goes, the tighter it "locks" to earth · Many sizes · A sensational time saver used by all Major Oil Companies! Buy through your local Supply Store.

Write for descriptive folder and prices.
PAT. PENDING
VAN DYKE INDUSTRIES
General Offices
3625 Cahuenga Blvd., Los Angeles 28, California

Stock Tank
ROUTING VALVE
New! Proven!


At Last!
A new, revolutionary stock tank Routing Valve that is set manually but switches flow from tank to tank AUTOMATICALLY! You save—
1. Save cost of Labor and Material on Original Hook-Up.
2. Save Pumper Mileage Returning to Top-Out Tanks.
3. Save Fire Hazards of Overflowing Tanks.
4. Save Checking of Pipe Line Strapping.
5. Eliminates Overflow Line.
6. Eliminates Manifolding Line.
Write For Complete Bulletin!
MURDOCK
TANK & MFG. CO.
TULSA, OKLAHOMA, U. S. A.

choke, TP 230 psi., GOR 429 cu. ft.; Mississippian 4,510 ft., IP flowed 686 bbl. 42°-gravity oil a day, 22/64-in. choke, CP 300 psi., GOR 366 cu. ft.

Wichita County: Hunter Bros. 1 S. T. Tuttle, Sec. 180, Waggoner Col. Subd., 8 mi. N Electra, TD 5,777 ft., pay 5,760 ft., IP flowed 146 bbl. 41°-gravity oil a day, 14/64-in. choke, TP 120 psi., GOR 300 cu. ft.

Wilbarger County: Gray Oil Co. 3-E Waggoner, Sec. 19, BS&F Sur., 10 mi. SW Vernon, TD 1,873 ft., pay 1,520 ft., IP pumped 70 bbl. 39°-gravity oil a day.

**NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES**

Archer County: Mummert & Holmes 1 Wilson Properties, Blk. 103, ATNCL, dry, TD 1,542 ft.

Brown County: Wm. McGentry 1 C. T. Parker, Sec. 11, BBB&C, dry, TD 1,259 ft.

Callahan County: J. Ross Clark 1 C. C. Joy, Blk. 761, Jacob Trask Sur., dry, TD 3,026 ft.

Woodson Oil Co. 2 R. L. Berry, Sec. 70, Bayland Orphan Asylum Lands, dry, TD 1,092 ft.

Clay County: G. W. Cooper 1 H. Sanzenbacher, Blk. 41, Grayson CSL, dry, TD 4,910 ft.

W. H. Hammon 1-A John Moser, Blk. 106, Parker CSL, dry, TD 1,885 ft.

J. R. Dillon 1 J. J. Raiser, J. Worley Sur. 1,129, dry, TD 2,249 ft.

Coleman County: Allsop & Ogden 1 Ray Lee, Blk. 1, GH&H 96, dry, TD 2,930 ft., elev. 1,857 ft., Morris 2,556 ft., Capps 2,595 ft., Gardner 2,758 ft., Gray 2,893 ft.

R. W. Brown 2 C. N. Prothro, W. Woolsey Sur. 294, dry, TD 2,123 ft.

C. U. Norton 1 Kay Classon, W. Fosgate Sur. 487, dry, TD 2,189 ft.

Cooke County: O. P. Leonard 1 W. S. Barous, F. E. Parks Sur. 1,213, dry, TD 1,672 ft.

M. P. Wilson 1 J. S. Bush, M. Carrico Sur., dry, TD 1,345 ft.

Eastland County: W. H. Keasler Oil Co. 1 M. Bryant, 20-1-H&TC, dry, TD 1,000 ft.

W. H. Keasler 1 R. F. King, Guadalupe College Sur., dry, TD 3,835 ft., elev. 1,513 ft., Caddo 3,037 ft., Mississippian 3,700 ft.

Fisher County: American Republics Corp. et al 1 E. L. Smith, 196-4-H&TC, dry, TD 6,735 ft., elev. 2,221 ft., Flippen 3,820 ft., Ellenburger 6,735 ft.

W. A. Moncrief 1 Genevieve Wood, 29-2-H&TC, dry, TD 6,712 ft., elev. 1,900 ft., Canyon 5,266 ft., Strawn 5,715 ft., Ellenburger 6,590 ft.

Rowan & Hope 1 M. S. Easterwood, 208-3-H&TC, dry, TD 7,020 ft., reef 5,608 ft., Ellenburger 6,835 ft.

Jack County: Fain & McGaha 1 J. R. Sloan, W. M. Berryman Sur., dry, TD 4,694 ft.

Knox County: Oil Associates, Inc. 1 M. L. White, 51-2-D&WRR, dry, TD 5,079 ft.

Montague County: S. D. Johnson 1 Nancy Slagle, J. W. Myers Sur., dry, TD 4,530 ft.

Nolan County: Rowan & Hope 1 City of Sweetwater, 41-3-T&P, dry, TD 7,020 ft., elev. 2,922 ft., reef 6,204 ft.

Shackelford County: G. D. Chastain 1 J. Klunts, Sec. 101, University Lands, dry, TD 4,091 ft., elev. 1,377 ft., Caddo 3,345 ft., Ellenburger 4,055 ft.

Stephens County: B. F. Phillips 1 H. E. Langford, 52-6-T&P, dry, TD 2,500 ft.

Stonewall County: Cities Service Oil Co. 1 Kakin, 11-A874-BBB&C, dry, TD 6,415 ft., elev. 1,606 ft., Caddo 5,781 ft., Mississippian 6,030 ft., Ellenburger 6,320 ft.

Throckmorton County: Green & Brookover 8 A. L. Whitaker, Blk. 956, TE&L Sur., dry, TD 760 ft.

Grisham-Hunter 1-A R. A. Brown, Sec. 1,613, TE&L, dry, TD 4,256 ft.

W. P. Luse 1 H. Schlitter, Blk. 1,646, TE&L, dry, TD 4,655 ft.

Russell Maguire 2 C. W. Buchanan, 927-A343-TE&L, dry, TD 4,249 ft., Caddo 4,129 ft.

Turner & Duvall 1 D. McKeichan, Blk. 3, GIR Sur., dry, TD 3,494 ft.

Wichita County: Fortex Oil Corp. 1 Raymond Herschi, Sec. 834, David Cowan Sur., dry, TD 2,085 ft.

Young County: Bay Petroleum Corp. 1 Geneva Gilmore, Sec. 3, BBB&C Sur., A-27, dry, TD 2,703 ft.

P. C. Brashear 2 Finch, Blk. 39, TE&L Sur., dry, TD 792 ft.

Fortex Oil Corp. 1 L. H. Lauschke, TE&L Sur., Sec. 465, dry, TD 1,306 ft.

# Texas Gulf Coast

## Matagorda Island Wildcat Establishes Oil Production

HOUSTON—Oil production has been established an the extreme southwest end of Matagorda Island, Matagorda County, at Producers Investment Corp. 1 Wynne & Morris, William Little Survey. The well was gaged for 25 bbl. of oil daily through perforations at 7,426-40 ft. Gage was made through 10/64-in. choke. Initially, tubing pressure was 1,500 psi., but decreased to 125 psi. at the end of the 2-hour test. The wildcat is bottomed at 8,415 ft. with 5½-in. casing set to 7,502 ft. Operators are continuing to test the above perforations.

One mile northeast of East Long Mott field, Calhoun County, Quintana Petroleum Corp. 1 W. C. Melbourn has established a new producing area. The well gaged 122 bbl. of 42°-gravity oil daily through ⅛-in. choke under tubing pressure of 850 psi. Production is through 48 shot perforations at 7,800-06 ft. Hole is bottomed at 8,843 ft. and operators set 5½-in. casing at 8,840 ft. Location is in I&GN RR Co. Survey, A-97.

New oil pay has been opened in the Kulcak area of Wharton County at Commercial Petroleum & Transport Co. 3 John Kulcak, ETRR Survey. The well flowed 80 bbl. of 28.5°-gravity oil daily through perforations at 4,975½-78½ ft. This area originally was opened in 1950 at 1 Kulcak, which found oil at 6,562-68 ft. The well was later reworked and completed as an oiler at 5,842-48 ft. Early this year, 2 Kulcak established gas-condensate at 4,950-54 ft.

Sohio Petroleum Co. is coring ahead in Edwards lime below 8,175 ft. in 1 N. W. Brown Estate, Fayette County wildcat, after drill-stem test at 8,076-87 ft. recovered salt water. Recovery on 30-minute test through ¼-in. chokes, using 1,000-ft. water cushion, was 90 ft. of salt water and 30 ft. of mud with the bottom portion cut with gas. Well previously flowed oil from the Buda lime at 7,826-62 ft., but this flow died and could


**NEW DAKOTA MAPS**

State maps showing sections, townships, ranges, county seats, oil wells, gas wells, dry holes with elevations, total depths and name of company who drilled test.

**27. "JACOBSON'S MAP OF NORTH DAKOTA SHOWING OIL AND GAS FIELDS"**

Size 51" x 74" Scale 1" = 5 miles
Paper $25.00 Linen $35.00

Size 26" x 37" Scale 1" = 10 miles
Paper $12.50 Linen $15.00

**28. "JACOBSON'S MAP OF SOUTH DAKOTA SHOWING OIL AND GAS FIELDS"**

Size 54" x 78" Scale 1" = 5 miles
Paper $25.00 Linen $35.00

Size 27" x 39" Scale 1" = 10 miles
Paper $12.50 Linen $15.00

F. O. B. Tulsa, Oklahoma

**E. C. JACOBSON, MAPS**
516 Mayo Bldg. Phone 2-1952
Tulsa (3) Oklahoma

**Protect Your VIKING PUMPS**

Father Time is kind to Viking Pumps because they're built sturdy and simple, having only two moving parts. However, you'll enjoy even longer and more dependable pumping service from your Vikings when you give them *extra* care.

For information and instructions on correct installation, operation and maintenance of your Viking Pumps, write today for your free copy of the Viking Service Manual T.

See Our Catalog In SWEETS

**Viking** PUMP COMPANY
Cedar Falls, Iowa

not be revived, so operators deepened to the Edwards.

**TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS**

Hardin County: American Republics Corp.-Houston Oil Co. 1 J. A. Vickers fee, John A. Vickers Sur., A-52, TD 7,854 ft., perf. 7,203-08 ft., IP: 4,919,000 cu. ft. of gas daily, ¼-in. choke, TP 2,340 psi.

Newton County: Gas discovery—Oil Drilling, Inc., 1 B. E. Quinn, HT&B Sur., A-1198, TD 8,770 ft., Yegua 7,370-72 ft., IP: no gage, CP 1,975 psi.

**TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES**

Brazoria County: Brazos Oil & Gas Co. 1 Mary M. Henderson, John Martin Sur., A-331, dry, TD 12,500 ft.

Chambers County: John W. Mecom 1-B Mayes Estate "B," Uriah Gibson Sur., A-101, dry, TD 4,505 ft.

Colorado County: Sparta Oil Co., et al., 1 Lawrence A. Johnson, I&GN Sur., A-312, dry, TD 10,583 ft.

Grimes County: J. H. Woodward, Jr., 1 Fannie Upchurch, et al, Louis Neal Sur., dry, TD 6,329 ft.

Lavaca County: Kirkwood & Co.-Alex W. Head 1 Julius Frank, M. A. Johnson Sur., A-259, dry, TD 9,015 ft.

Liberty County: The Texas Co. 1 Louis M. Swilley, et al, Hugh Means Sur., A-78, dry, TD 8,517 ft.

Live Oak County: Delhi Oil Corp. 1 H. D. House, Sur. 160, dry, TD 7,590 ft.

Montgomery County: Commercial Petroleum & Transport Co. 1 Pitts & Lyles, T. J. Stansberry Sur., A-485, dry, TD 11,532 ft.

Newton County: Hankamer Investment Co. 1 E. W. Brown, James Henderson Sur., dry, TD 8,400 ft.

★ For working pressures from 1500 to 3000 lbs.
★ All parts interchangeable
★ Bean is quickly and easily replaced
★ Easily converted to positive choke
O-C-T THREADED ADJUSTABLE CHOKES GIVE YOU
Four Star Flexibility
The O-C-T Type "N" Adjustable Choke has earned its reputation as the most popular choke in the field by outstanding, dependable performance. In combination with O-C-T Flow Tees, this choke can be used to make proration tests by simply backing off the yoke nut and inserting the proper size O-C-T FC-140 positive bean or O-C-T FC-141 insert cage bean. Ask your O-C-T representative or write for complete mechanical details on the O-C-T Choke that gives you four star flexibility. Available through your supply store.
Oil Center Tool Co.
P. O. Box 3091, Houston, Texas
O-C-T HAS PIONEERED HIGH PRESSURE CONTROLS


# Oklahoma

## Lincoln County Adds Another Oil Discovery

ANOTHER addition to the long list of discoveries in Lincoln County during the past year appears to have been made by The Texas Co. at its 1 Roberts, SW SW NW 34-13n-3e, which flowed 55 bbl. of oil by heads in 24 hours through 1-in. choke while testing Skinner sand, opposite which casing is perforated at 4,542-49 ft. Hole was drilled to 4,975 ft. and then plugged back to 4,577 ft. with casing at 4,615 ft. Location is 1¾ miles north and slightly east of The Texas Co.'s Mammoth pool, in the south central part of the county. The latter pool, opened last year, produces from Red Fork sand.

Production of the recently opened Southeast Rich Valley pool, Grant County, has been extended ¾ mile to the southwest by Viersen & Cochran and Mid-Continent Petroleum Corp. at their 1 Shrubshall, NE SE SW 7-25n-4w. The extension well, the second for the pool, flowed 250 bbl. of oil in 24 hours through ¼-in. choke from open hole at 5,832-50 ft. in the discovery well's second Wilcox sand pay zone. At the same time, Sinclair Oil & Gas Co. 2 Mulkey, SE NW NE 7-25n-4w, southeast offset to the company's 1 Mulkey (discovery well), is showing for the pool's third producer. In a drill-stem test, open 53 minutes, at 5,800-07 ft., it had gas at the surface within 4 minutes and started flowing oil, estimated at 25 bbl. per hour, within 35 minutes. The breakdown yielded 1,270 ft. of oil with about 5 ft. of water, slightly salty. Casing has been run to the top of the pay. Two other tests, Carter Oil Co. 1 Shrubshall, northeast offset to the discovery well, and the same operator's 2 Shrubshall, southwest offset, are near the pay. Sinclair is starting its third well, 3 Mulkey, NW SW NE 7-25n-4w, a location southwest of 2 Mulkey.

In northwestern Stephens County, in the southern part of the state, Shell Oil Co. 1 Tugman, NE SW NE 11-2n-8w, swabbed and flowed 3 bbl. of gassy mud per hour for 12 hours, and then flowed an average of 2 bbl. of 55° gravity oil per hour for 8 hours from perforations at 6,606-16 ft. Previously tested was a zone at 7,510-7,600 ft., where it flowed 69 bbl. in 28 hours. Additional zones, higher in the hole, remain to be tested. A zone at 6,078-6,112 ft. in Hoxbar sand, gave the best indication of production on drill-stem tests.

Sinclair Oil & Gas Co. recovered 10 ft. of 25°-gravity oil and 5 ft. of heavily oil-cut mud in a 30-minute drill-stem test at 7,272-7,319 ft. in lower Deese sand at its 1 Community-Sanders, NW SE NW 5-7s-1w, southeast of the Stockton pool, Love County. Hole is being deepened to its projected depth of 9,200 ft.

Production of the Elk City field, Beckham County, is being extended another ½ mile northwest where Howell & Howell and Walter Duncan 1 Johnson-Reisner, C NE NE 11-10n-22w, swabbed at the rate of 1 bbl. of oil per hour from casing perforations at 9,946-60 ft. Total depth is 10,686 ft. with 5½-in. casing at 10,507 ft.

**OKLAHOMA SUCCESSFUL WILDCATS**

Carter County: Stanolind and Amerada 1 Johnson, SE NW NE 4-2s-3w, flowed 57 bbl. 35.5°-gravity oil from sand at 6,416-20 ft., 6,392-96 ft., 5,704-10 ft., and 5,718-24 ft., TD 6,801 ft., County Line lime 2,440 ft., Deese 2,950 ft., Tussy sand 3,285 ft., Tussy lime (?) 3,667 ft., lower Deese 4,038 ft., geological wildcat in Sholem Alechem.

Stephens Petroleum 1 Haas, NW SE NE 9-2s-3w, flowed 259 bbl. 43°-gravity oil from Humphries sand at 6,410-18 ft. and 6,432-51 ft., TD 7,225 ft.

Payne County: Republic Natural Gas 3 Vogt, NW SW SW 22-19n-4e, flowed 89 bbl. oil from Prue at 3,335-41 ft., TD 3,929 ft., zone discovery in Ingalls.

Stephens County: The Texas Co. 1 Helm, SW SE NW 21-2n-8w, flowed 265 bbl.

36°-gravity oil from lower Sears sand at 6,685-6,700 ft., TD 6,733 ft., OWDD, was producing from 4,971-5,014 ft.

**OKLAHOMA WILDCAT FAILURES**

Garvin County: Sohio 1 Blythe "B," SE SE SE 19-1n-1e, dry, TD 1,501 ft., strat test in NW Hoover.

Sohio 1 Grant, SE NW NE 29-1n-1e, dry, TD 1,508 ft., strat test in NW Hoover.

Kay County: Kidd 1 Constant, NW NW SW 33-27n-1e, dry, TD 3,722 ft.

Lincoln County: Mid-Continent 1 Biles, NE NW SW 21-15n-5e, dry, TD 3,711 ft.

Logan County: Portable Drilling 1 McLean, NE NE NW 22-16n-1w, dry, TD 5,752 ft.

Okfuskee County: Wilcox 1 Farris, SW SE SE 4-13n-7e, dry, TD 3,625 ft.

Osage County: Anderson-Prichard 1, SW SE NE 29-24n-4e, dry, TD 2,545 ft.

Pawnee County: T. N. Berry Co. 1 Miller, SW SE NW 2-21n-5e, dry, TD 3,111 ft.

Tillman County: Anderson-Helton 1 Davenport, NW NW SE 35-4s-15w, dry, TD 2,313 ft.

## Michigan

### Rose City Richfield Pool Attracting Wide Interest

MOUNT PLEASANT.—Rose City Richfield oil pool, Ogemaw County, is now demanding more attention and interest than any developing field in Michigan.

With Muskegon Development Co. testing a flowing well on the north-northwest flank of the structure, Brazos Oil & Gas Co. testing another successful producer on the west-extension area of the field, and with Sun Oil Co. reporting a good Traverse oil show on an offset to the Brazos producer in the west-extension area, it appeared that an important development program, both from a drilling and new reserves standpoint, might be shaping up for the area.

At Muskegon Development Co. E-3, State-Foster, NW NW NE 28-24n-2e, tests were being run after acidizing with 6,000 gal. in the Richfield at 4,231 ft., total depth. Well flowed as much as 100 bbl. of oil a day on initial tests after a 2,500-gal selective treatment. Muskogen Development had staked the diagonal southeast 40-acre offset.

In the west extension area, Brazos Oil & Gas Co. KKK-2 State-Foster, N½ NW SE 25-24n-1e, was showing for about 45 bbl. of oil a day from the Richfield after initial acid treatments with 1,500 and 3,000 gal. Well will be reacidized.

Sun Oil Co. cored and tested with drill-stem at the B-1 State-Foster, N½ SW SE 24-24n-1e. Operator reported gas and mud-cut oil from the Traverse at 2,015-75 ft. Well showed 160,000 cu. ft. of gas in 15 minutes; only 30,000 cu. ft. gas after 90 minutes, 750 ft. of mud-cut oil, and some salt water. The B-1 is the offset to a Brazos producer, first in the section. Well will be drilled on to the Richfield, but Sun indicated that close check will be made of the Traverse section on all future wells drilled in the area. An older well, drilled several years ago with cable tools and located to the south, was produced for a short time from the Traverse.

**MICHIGAN WILDCAT FAILURES**

Antrim County, Mancelona Township: Empire Petroleum Co. 1 Fleming Homan et al, SW SW SE 19-29n-6w, Monroe 2,276 ft., dry, TD 2,308 ft.

Ionia County, North Plains Township: C. W. Collin 1 Sessions, SE SE NE 6-8n-5w, Dundee 3,018 ft., dry, TD 3,048 ft.

Kent County, Tyrone Township: James J. McGerry, Trustee, 1 Mouthaan, NE NE SW 3-10n-12w, Traverse 2,334 ft., dry, TD 2,340 ft.

Oceana County, Grant Township: Max Spidel 1 Grossman, SE NE NE 29-13n-17w, Traverse 1,785 ft., dry, TD 1,811 ft.

## Eastern Texas

### Oil Creek Extension-Offset Tests Pennsylvanian Shows

DALLAS.—The Texas Co. 1 E. C. Anderson, E. Hartzog Survey, and north offset to a recent ½-mile south extension to Oil Creek sand pay in the Sandusky field, had good shows and oil recovery from the Pennsylvanian.

Sand with oil shows was drilled from 6,785-89 ft., then shale from 6,789-6,803 ft. and further oil sand from 6,803-15 ft. A 90-minute drill-stem test of the entire section had gas in 12 minutes and recovered 2,488 ft. of clean oil, plus 120 ft. of oil-cut mud. Drilling was to continue.

New extension test for the area was made by Mid-Continent Petroleum Corp. as the 1 Susie Martin. Location was staked in the I. B. Walker Survey, approximately 1¼ miles southwest of the most southerly Oil Creek producer in the field.

Southeast of the original Ellenburger discovery in the Sandusky field, L. O. McMillan reported sand with good order and oil stain from 7,623-39 ft. A drill-stem test was under way at last report.

Star Oil Co. 1 Walling, wildcat 2 miles east of Tioga, was reported dry at 4,260 ft.

Humble Oil & Refining Co. 1 Fred Marberry, Freestone County wildcat northeast of Kirvin, was reading at 6,623 ft. following a drill-stem test at 6,532-73 ft. which recovered 184 ft. of gas-cut mud.

Lone Star Producing Co. had location cleared for its 1 Billy Creswell, a 8,500-ft. wildcat in the T. Stephens Survey, 9 miles northwest of Thornton in Limestone Coun-


NOW...More Than Ever...
PROTECT YOUR TANKS!

Shortages of steel, for new tankage and repair of old, necessitates your making every tank last as long as possible.

NATASCO protective coatings prevent corrosion damage of new tanks and provide many additional years of service from old ones.

Trained application crews provide a complete protection service including preparation of the surfaces, priming and application, assures maximum results. Your request for full particulars will receive prompt attention. Telephone, wire or write.

CONTRACT SERVICES:
- Tank Welding Repairs and Maintenance
- Installation of Tank Appurtenances
- Tank Painting
- Application of Protective Coatings
- Tank Cleaning — BS&W Emulsion Chemical Treating

Manufacturers of Natasco Level Tank Gauges

THE Natasco COMPANY
P. O. BOX 1318 TULSA, OKLAHOMA

Lease Tank Service—West Texas Area:
Williams Construction Co.
Odessa, Texas

California Representative:
Pacific Coast Contractors, Inc.
2627 Atlantic Ave., Long Beach 6, Calif.

ty. Delta Drilling Co. holds contract.

**EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES**

Kaufman County: T. D. Humphrey 1 K. P. Blakey, George Isaacs Sur., dry, TD 5,525 ft., Woodbine 3,650 ft.

Robertson County: T. O. Posey 1 A. G. Weber, J. Smith Sur., dry, TD 1,050 ft. Pryor-Dillard 1 C. B. Mears, G. Browning Sur., dry, TD 1,780 ft.

Van Zandt County: P. B. Berry 1 H. S. Neil, Thomas Hays Sur., dry, TD 6,308 ft., Woodbine 4,019 ft., Paluxy 5,090 ft., Glen Rose 5,232 ft.

# Southwest Texas

## Sunray Strikes New Deep Pay At Two Dagger Island Wells

CORPUS CHRISTI.—New deep pay has been established in Dagger Island (Red Fish Bay) field, Nueces County, at two Sunray Oil Corp. wells. The firm's 1 State Tract 394, on the southwest flank of the structure, flowed 336 bbl. of oil daily through perforations at 8,240-48 ft. Through 8/64-in. choke, it flowed 240 bbl. daily under 1,220 psi. on tubing. This new deep pay is designated at 5-B sand. A new gas-distillate sand was also found in this well at 8,330-37 ft. Through ¼-in. choke, it flowed 55 bbl. of distillate plus 1,750,000 cu. ft. of gas daily. Tubing pressure was 1,510 psi. These perforations were squeezed.

To the southwest, Sunray 1 State Tract 395, established a new oil sand at 8,346-52 ft. After flowing at the rate of 113 bbl. of oil daily for an hour, the well died. Operator came up the hole and perforated at 8,016-25 ft. for completion. Well is now awaiting potential test, after flowing at the rate of 159 bbl. daily based on 1-hour test through 12/64-in. choke.

Potential test has been run on LaSalle County's first Carizzo zone strike. Henderson Coquat and O. R. Mitchell 1 Carlos Pena, I&GN Survey 19, Abstract 897, pumped 37 bbl. of 22°-gravity oil daily through perforations at 2,214-18 ft. The venture was drilled through the Carrizo to total depth of 5,757 ft. before plugging back for completion. Seven-inch production string is cemented at 2,220 ft. with 2-in. tubing at 2,290 ft.

Lundell Brothers 8 E. C. Lundell, Chernosa sand strike in Duval County, has been potentialed for 32 bbl. of 24.4°-gravity oil daily on pump. Production is from open hole at 1,858 ft. and total depth of 1,863 ft. This new sander, located in J. Poitevent Survey 364, Abstract 1962, 4,700 ft. west of North Government Wells field, first showed as a discovery when 15-minute drill-stem test at 1,858-63 ft. recovered 360 ft. of pipeline oil.

**SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS**

Brooks County: New pay at Rachal—Humble Oil & Refining Co. 1 Lucas Remirez Estate, et al, Share 14, Block 3-A "La Encantada" Grant, TD 6,600 ft., perf. 4,801-06 ft., IP: 8 bbl. oil per day, 45° gravity. (Old well worked over and recompleted as an oiler).

Duval County: Oil discovery—Lundell Bros. 8 E. C. Lundell, J. Poitevent Sur. 364, A-1962, TD 1,863 ft., Chernosa 1,858-63 ft., IP: 32 bbl. oil per day on pump, 24.4° gravity.

Nueces County: Oil discovery at Dagger Island—Atlantic Refining Co. 1 State Tract 396, in Corpus Christi Bay, State Tract 396, TD 9,495 ft., perf. 7,926-46 ft., IP: 202 bbl. oil per day, 9/64-in. choke, 40.2° gravity.

New pay at Dagger Island—Atlantic Refining Co. 1 State Tract 398, in Redfish Bay, TD 8,252 ft., perf. 7,942-58 ft., IP: 123 bbl. oil per day, ⅛-in. choke, 40° gravity.

**SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES**

Brooks County: The Chicago Corp. 2 Boedeker Ranch, CCSD&RGNG RR Co. Sur. 8, 1 mi. S of Boedeker field, dry, TD 5,515 ft.

Cameron County: C. G. Glasscock 1 Mellie Esperson Estate, Share 1, Potrero de San Martin Grant, dry, TD 11,436 ft.

Duval County: Forney & Winn 1 J. F. Welder Heirs, Norman G. Collins GB&-CNG Sur. 219, A-868, dry, TD 2,930 ft.

Gorman & McCarrick, Tr., 1 DCRC, Juan L. Saen Sur. 158, A-1172, dry, TD 3,210 ft.

H. L. Hunt 1 C. G. Palacios, P. R. Knight Sur. 8, A-812, dry, TD 5,354 ft.

Sid Katz B-2 Viggo Gruy, et al, S. G. Hayes Sur. 156, A-1727, 12 mi. NW of Realitos, dry, TD 3,000 ft.

A. O. Morgan 1 A. C. Jones, Sec. 58, Copita Farm & Garden Tracts, dry, TD 5,052 ft.

Jim Wells County: Lundells, Inc., 1 Lundells, Inc., fee, Theo. Plummers Resubd. of Camada Ranch, dry, TD 5,981 ft.

Nueces County: H. L. Hunt 1 Herbert Worff, Sec. 3, Geo. H. Paul Subd. of Driscoll Ranch, dry, TD 7,225 ft.

Lamar Hunt Trust Estate 1 M. M. Gabriel, Mantor Briggs & Kuykendall Subd., Casa Blanca Grant, dry, TD 7,397 ft.

Selby-Walker Corp. 1 D. C. Hellman, Sec. 148, E. R. Oliver Sur., A-959, dry, TD 4,010 ft.

Starr County: Bass & Vessels 1 E. G. Gonzales, Porc. 71, A-86, dry, TD 2,016 ft.

Bass & Vessels 1 H. Gonzales Heirs, Sur. 338, 2¾ mi. NW of Arroyo Grande field, dry, TD 2,023 ft.

Webb County: Killam & Hurd, Inc., et al.

SAFER TO USE!
WILL NOT CHIP

BJ's exclusive Selective Hardening process provides shock-absorbing core and ends plus super-hard teeth.

For all rotary and casing tongs

Byron Jackson Co.
Since 1872
MAIN OFFICE & PLANT: LOS ANGELES 54, CALIF.
Mid-Continent Office & Plant: Houston 1, Texas
Export Office: New York 17, New York
JOBBERS IN ALL PRINCIPAL OIL FIELDS

ANOTHER BJ ENGINEERED PRODUCT

FOR all MILLING OPERATIONS...
Whatever your milling requirements, Kinzbach makes a mill that will meet them. Bodies are of high quality steel, shaped for best cutting results; inserted blades are made of high speed tool steel, properly ground for most efficient cutting action, and spiral-set for uniform depth of cut which eliminates much of the danger of twisting-off drill pipe.
KINZBACH TOOL CO., INC.
P. O. Box 277—Houston, Tex.
Export Office: 74 Trinity Place, New York, N. Y.
KINZBACH TOOL CO.

1 Gaspar Guerra, Sur. 711, 1¾ mi. S-SW of Lopez field, dry, TD 3,106 ft.

Zapata County: Kinney & Stevens, et al, 1 Alfonso Garcia, Share B, Charco Redondo Grant, dry, TD 725 ft.

Charles E. Long, et al, 3 Noules Smith, El Javali Grant, Share 7, dry, TD 1,802 ft.

Seaboard Oil Co. of Delaware 1 Robert Hinnant, Sur. 72, A-478, dry, TD 2,906 ft.

E. A. Thompson 1 S. Benavides Estate, Fansler-O'Hern Subd. of Villa Grant, dry, TD 1,985 ft.

# Permian Basin

## Yoakum County Deep Wildcat Plugs Back to Test Permian

MIDLAND.—Continental Oil Co. 1 Pierson, deep wildcat in northwest Yoakum County, had plugged back from 12,325 ft. and was testing in the Permian through perforations at 5,207-31 ft. The well kicked off after swabbing load oil, and flowed 10 bbl. of oil in 8 hours. It was also making water with the oil.

In Gaines County, Forest Oil Co. 1-B Parmer, wildcat projected to 13,000 ft., was testing around 9,501 ft. Some reports identified the section as in the Spraberry.

Magnolia Petroleum Co. 1 Chilton, Pennsylvanian reef discovery in southeast Gaines County, flowed oil at the rate of 340 bbl. daily from perforations at 11,354-75 ft., then set bridge-plug and perforated between 11,-344-352 ft. The latter section developed 205 bbl. of new oil in 14 hours, swabbing and flowing.

West of Stanton in Martin County, Tide Water Associated Oil Co. 1 Dickenson prepared to complete from the Ellenburger. Corrected total depth was 12,136 ft. and casing liner had been set 1 ft. off bottom. Previous to running the liner, a 28-hour drill-stem test from 12,098-12,140 ft. had gas in 3 hours and clean oil in 6 hours and 14 minutes.

The well flowed for 30 minutes, making 9 bbl. of oil, then made several heads of oil. There was salt water in the pipe after 15 stands had been pulled.

Stanolind Oil & Gas Co. 1 McCutcheon, Jeff Davis County wildcat northeast of Fort Davis, topped the Delaware lime at 5,720 ft., then tested salt water from 5,715-5,810 ft. It was drilling ahead on a 10,500-ft. contract.

Gulf Oil Corp. 3 Glass, ½ mile east of the Glass Pennsylvanian discovery in the Glass field, southwest Martin County, prepared to drill-stem test from 8,574-8,674 ft. A core from 6,624-74 ft. recovered 50 ft. of sand and shale, a part of which was bleeding oil. The 3 Glass was said to be some 10 ft. high on the Spraberry to the Spraberry discovery well of Glass field.

North and slightly west of Stanton, Deep Rock 1 Mrs. Nettie McWhorter flowed 10 bbl. of fluid with some oil in 1 hour after being shut in for 46 hours.

Kerr-McGee Oil Industries 1-B-11-23 University, south-central Andrews County, completed as a Wolfcamp discovery. Completion potential was 231 bbl. of 42°-gravity oil flowing through 14/64-in. choke from casing perforations at 7,956-70 ft.

A new Strawn field was in prospect north and slightly west of the North Hulldale field, Schleicher County. W. W. West 1 Christena Mittel was reported to have flowed at the rate of 15 bbl. of oil an hour on a drill-stem test in Strawn lime at 6,172-6,222 ft. The report also said the top of the Strawn was lower than the water table in the same strata in the North Hulldale field, which would indicate a separate structure.

Humble Oil & Refining Co. 1 Launa Thomas, deep Lynn County Ellenburger test, had water in that formation and prepared to plug back for tests up the hole. Water was encountered on a test in the Ellenburger from 11,324-11,526 ft.

North of the Pegasus area, Gulf Oil Corp. 1 John Windham cored lime and shale with no shows between 10,504-54 ft.

Sinclair Oil & Gas Co. 1-A June Tippett recovered drilling mud with no shows at 13,090-13,143 ft. and was coring ahead below that depth.

### WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Andrews County: Neville G. Penrose 1 Lydia Littman, 6-A29-PSL, TD 4,339 ft., elev. 3,537 ft., San Andres pay 4,313 ft., IP pumped 54.5 bbl. 32°-gravity oil a day.

Midland County: The Texas Co. 1-D Scharbauer, 19-39-2s-T&P, TD 10,750 ft., elev. 2,827 ft., perf. Pennsylvanian 9,560-9,730 ft., IP: flowed 65 bbl. 40°-gravity oil a day, 12/64-in. choke, GOR 909:1, TP 190 psi.

### WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Andrews County: Headwaters Oil Co. et al 1 W. J. Underwood, 17-A34-PSL, dry, TD 5,529 ft.

Concho County: Rock Hill Oil Co. 1 B. McIver, 336-72-T&NO, dry, TD 1,451 ft.

Cottle County: Humble Oil & Refining Co. 2-J Matador Land & Cattle Co., 47-A-J. H. Stephens Sur., dry, TD 6,125 ft.

Crockett County: Rasbury & Henderson 1 Harrell, 24-XX-Sur. 24, dry, TD 1,170 ft.

The Texas Co. 1 E. C. Marrs, 28-HH-GC&SF, dry, TD 8,193 ft., elev. 2,360 ft., Spraberry 2,350 ft., Simpson 7,285 ft., Ellenburger 7,966 ft.

Dawson County: Atlantic Refining Co. 1 Hardy, 277-57-Glasscock CSL, dry, TD 12,166 ft., elev. 3,020 ft., Spraberry 7,870 ft., Pennsylvanian 10,355 ft., Mississippian 11,085 ft., Devonian 12,000 ft., Fusselman 12,125 ft.

Lynn County: Shamrock Oil & Gas Corp. 1 Mariam Green, 1-7-Wilson, CSL, dry, TD 9,974 ft., elev. 3,132 ft., Spraberry 6,440 ft., Strawn 9,056 ft., Ellenburger 9,904 ft.

Reagan County: Humble Oil & Refining Co. 1 Cynthia Malone, 1,213-C-C&SE, dry, TD 11,415 ft., elev. 2,628 ft., Spraberry 5,785 ft., Strawn 9,610 ft., Devonian 10,-694 ft.

Humble 1-E University, 28-58-University Lands, dry, TD 11,074 ft., elev. 2,658 ft., Spraberry 5,848 ft., Ellenburger 10,890 ft.

Runnels County: Saxon Exploration Co. 1 Ben Schwetner, Sec. 153, Hamilton Sur., dry, TD 4,630 ft., Strawn 4,045 ft.

C. B. Cree 1 H. A. Stephens, GC&SL Davenport Sur. 12, dry, TD 4,020 ft., Gardner 3,880 ft.

Scurry County: D. D. Feldman 1 P. L. Fuller, 619-97-H&TC, dry, TD 7,628 ft., elev. 2,220 ft., reef 6,830 ft., Strawn 7,072 ft., Ellenburger 7,580 ft.

Tom Green County: J. Roy McCoy 1 Tupper, Sec. 1,646, D. Burgdorf Sur., dry, TD 5,005 ft., elev. 1,787 ft., Canyon 3,193 ft., Strawn 4,163 ft., Ellenburger 4,710 ft.

### SOUTHEASTERN NEW MEXICO

HOBBS.—Two prospective discoveries in Lea County prepared to make production tests and complete.

The Texas Co. 1-A State, 8 miles west of the Saunders Pennsylvanian field, was running casing to bottom at 9,730 ft. after testing a section tentatively identified as Wolfcamp. The drill-stem test from 9,691-9,730 ft. had gas in 3 minutes and flowing oil in 9½ minutes. It gaged 78 bbl. of 41°-gravity oil in 50 minutes. Location is 6-15s-32e.

Texaco's 1-AR State in 2-11s-37e, north of the Gladiola field, was running electrical surveys after a second drill-stem test in the Devonian from 11,430-11,500 ft. Recovery after 3 hours and 14 minutes was 460 ft. of drilling mud, 3,400 ft. of gas-cut mud, 1,840 ft. of oil and gas-cut mud, and 1,380 ft. of oil and gas-cut water.

First test in the 1-AR State from 11,430-55 ft. developed considerable free oil, some of which was unloaded while pipe was pulled.

# South Louisiana

## Acadia Parish Wildcat Producing 210 Bbl. Daily

NEW ORLEANS.—Approximately 1⅛ miles southwest of South Bayou Mallet field production, Bates & Cornell have completed 1 Mrs. Lawrence E. Frey to open a new field in Acadia Parish. The wildcat flowed 210 bbl. of 24.8°-gravity oil daily through 9/64-in. choke through perforations at 9,438-46 ft. Tubing pressure was 850 psi. on the test. Location is approximately 2 miles north of Judd in 31-7s-1e.

Humble Oil & Refining Co. has potentialed its Lafourche Parish discovery, 1 Louisiana Land & Exploration Co. "C," for 269 bbl. of 57°-gravity distillate per day. The well is producing through perforations at 9,166-69 ft. Hole was drilled to total depth of 13,837 ft. and 7-in. casing run to 13,349 ft. Shows were logged at in-

tervals 10,262-66 ft. and 10,273-77 ft., both of which yielded condensate on tests. This well is located in the East Golden Meadow area of the parish.

Union Producing Co. and Texas Gulf Producing Co. are preparing to test 1 State Lease 1,743, Township 19s-17e, Terrebonne Parish. Hole was bottomed at 14,887 ft. and plugged back to 9,587 ft. after running electrical survey. Operators perforated 9,449-50 ft., squeezed, and are waiting on cement before reperforating.

In the Blind Bay area of Plaquemines Parish, The Texas Co. is testing 1 State-Blind Bay, Township 22s-21e. Perforations have been effected at 12,898-12,938 ft. with 240 shots. No results of the test have been reported. Meanwhile, Texaco has staked location for A-1 State Lease 1607-Blind Bay, a proposed 10,000-ft. wildcat.

The first dual producer in Clovelly field, Lafourche Parish, has been completed at Superior Oil Co. 2 Clovelly Corp., 33-18s-22e. The well flowed 81 bbl. of 31.1°-gravity oil daily through 7/64-in. choke through annulus between casing and tubing. Perforations were effected from 12,702-12 ft. Flowing pressure on the tubing was 1,400 psi. The well was originally completed through perforations at 12,790-12,815 ft., the well made 220 bbl. of 30.8°-gravity oil daily through 7/64-in. choke.

### SOUTH LOUISIANA SUCCESSFUL WILDCAT

Avoyelles Parish: Sohio Petroleum Co. and Pan-Am Southern Corp. 1 Bordelon, 36-2n-5e, on Bordelonville prospect, TD 9,004 ft., perf. Wilcox 8,407-11 ft., IP: 160 bbl. oil per day, 14/64-in. choke, 49° gravity, TP 450 psi.

Orleans Parish: The Texas Co. 1 State-Lake Borgne, located in Lake Borgne, TD 13,270 ft., perf. 7,197-7,221 ft., IP: 3,198,000 cu. ft. of gas per day, 3/16-in. choke, TP 2,600 psi.

### SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Cities Service Oil Co. 1 Winston Atteberry, 41-7s-1e, dry, TD 10,000 ft.

Jefferson Parish: Superior Oil Co. 1 Little Lake State Lease 1683, on Little Lake prospect, dry, TD 13,286 ft.

## Appalachian-Ohio

### Maryland Exploratory Work Continues at Great Pace

PITTSBURGH.—In Garrett County, Maryland, Eberly & Snee completed 1 Otis Shaham gaging 369,000 cu. ft. of gas in the chert, and 1 R. L. Gilbert resulted in a dry hole through the Onondaga. New York State Natural Gas Corp. 1-N-225 Orville Kitzmiller also resulted in a dry hole through the Oriskany sand. Operations have been started at three new locations: New York State Natural Gas Corp. 2-N-247 John K. Shaw; Richard Downing 1 McClain; Roy Fletcher 1 Mary Riser.

In Portland district, Preston County, West Virginia, Hope Natural Gas Co. located 9673 Nina Kay, wildcat, elevation 2,296 ft., on Kingwood Quadrangle, .35 mile south of Lat. 39° 25′ and 4.05 miles west of Long. 79° 30′. In Triadelphia district, Logan County, Wetzel Lusher completed 1 Gilman Miller gaging 2,468,000 cu. ft. of gas in the Big lime and Berea sand, total depth 2,958 ft., Seventeen new locations were reported, throughout Calhoun, Jackson, Lincoln, Mingo, McDowell, Pleasants, Preston, Raleigh, Ritchie, Roane, and Wayne counties.

In Napier Township, Bedford County, southwest Pennsylvania, South Penn et al, after recovering the tools in 1 Jesse B. Miller, resumed drilling and reached a depth of 8,882 ft., and are in another fishing job. Four new locations were reported, one each in Clarion and Jefferson counties, and two in Washington County.

### MARYLAND SUCCESSFUL WILDCAT

Garrett County: Eberly & Snee 1 Otis Shaham, elev. 2,459 ft., Tully 2,788 ft., Onondaga 3,372 ft., chert 3,410 ft., gas 3,468 ft. (369,000 cu. ft. after shot), Oriskany sand 3,531 ft., TD 3,662 ft.

### MARYLAND WILDCAT FAILURES

Garrett County: Eberly & Snee 1 R. L. Gilbert, elev. 2,468 ft., dry, Tully 3,980 ft., Onondaga 4,005 ft., TD 4,854 ft.

New York State Natural Gas Corp. 1-N-225 Orville Kitzmiller, elev. 2,403 ft., dry, Onondaga 3,894 ft., chert 3,938 ft., Oriskany sand 4,104 ft., TD 4,532 ft.

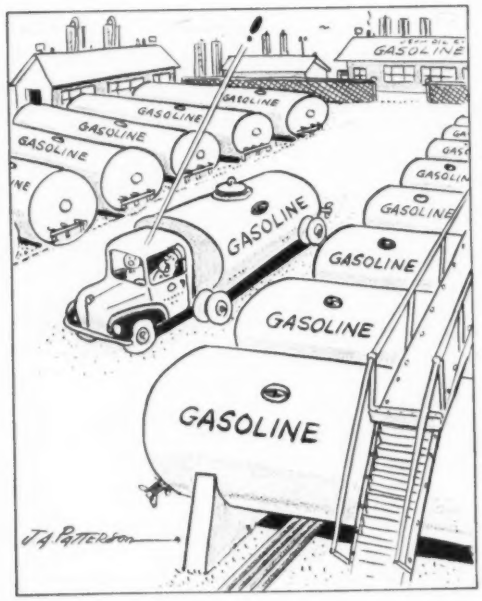
### OHIO

COLUMBUS.—National Gas 4 O. S. Holliday, Section 14, Walnut Township, Fairfield County, topped the Newburg at 1,954 ft. and was drilled in to 1,961 ft., where gas gaged 220,000 cu. ft. with a good showing of oil. After shooting with 30 qt., the well made 173 bbl. and an estimated 400,000 cu. ft. gas.

Kinsey & Mossholder 2 K. E. Anderson, Section 9, Pike Township, Coshocton County, an outside location to extend the oil field, found only 230,000 cu. ft. of gas and a small show of oil. After shot, the well produced an estimated 600,000 cu. ft.

McClay & McDonald 2 Ashcraft, Section 21, Fallsbury Township, Licking County, found a good oil show in the Clinton at 2,887-2,923 ft. The well was shot and made 50 bbl. in the first 24 hours.

Ohio Fuel 1 Porter-Hayes consolidation in Lot 78, Granger Township, Medina County, gaged 120,000 cu. ft. of gas in the Shell at 3,429-47 ft. and 985,000 cu. ft. in the White Clinton at 3,487-95 ft.




THE OIL AND GAS JOURNAL

*"Whatta' you know—we're outta' gas!"*

YOU GET SPEED that saves dollars and time with

Truco DIAMOND BITS

D&S CORE BARRELS

Drilling & Service

3031 Elm Street Dallas 1, Texas
OFFICE PHONE: Riverside-6811
NIGHT NUMBERS: TRemont-5559, Victor-3708, Dixon-4176

Other Offices-Services
Tyler, Texas.....2-2742 Norman, Okla.....4360
Odessa, Texas....6-6774 Shreveport, La....5-5474
Abilene, Texas....2-2790 Casper, Wyo.....3739
Victoria, Texas.....3264 Carmi, Ill.....7801

Distributors
Diamond Drilling Co., 2759 E. Willow St., Long Beach, Calif., Telephone: Long Beach 40-7949
Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861

Foreign
D. T. O'Connor, 500 Fifth Avenue, New York, N. Y.
Petroleum Industry Consultants, C. A., Caracas, Venez.
Denton-Spencer Co., Ltd., Calgary, Alberta, Canada.

# Canadian Fields

## Two Natural Gas Strikes Completed In Alberta

CALGARY.—Royalite Oil Co. struck natural gas at its Delph area wildcat located on farmout lands from the Seaboard Group and Canbridge Corp. team, about 14 miles east of the northern sector of Redwater oil field. The discovery was made in the Lower Cretaceous sands, where a section of about 9 ft., from 2,512-21 ft., was found. The well, Royalite-Seaboard-Delph 1, in LSD 10, 17-58-19w4, is located about 37 miles northeast of Edmonton and 6 miles southeast of Royalite-Radway 1 wildcat failure. The first drill-stem test was run from 2,506-17 ft., with gas flowing to the surface immediately, at maximum rate of 1,500,000 cu. ft. daily. A second test, from 2,516-22 ft., gave a small immeasurable gas flow, with 1 hour pipe recovery being 450 ft. of salt water. Crew is now drilling and coring below 2,525 ft. Proposed depth of the hole is around 3,500 ft.

A. G. Bailey Co. & Associates discovered natural gas in the top of the Madison limestone at Bailey-Turin 12-12 wildcat, in the Turin area 100 miles southeast of Calgary and 24 miles northeast of Lethbridge. The venture is located about 5 miles northwest of Anglo-Calmont-C. & E.-Turin 1, completed last year as a Madison gas discovery. Further drilling will be required to establish the relationship, if any, between the two strikes. The Bailey well topped the Madison lime about 3,570 ft. and ran a drill-stem test of the interval 3,582-3,602 ft. A 1-hour test gave a gas flow building up to 1,640,000 cu. ft. daily. Pipe recovery was a 10-ft. column of oily, gas-cut mud. The well is now coring on, and will run further tests at intervals.

The Bashaw D3 Devonian oil discovery well is now being readied for production testing after gun-perforating the zone. The well, owned by American Leduc Petroleums, Ltd., and Yankee Canuck Oil & Mining Corp. is scheduled to run potential tests over the week end. The well, American Leduc-Bashaw 1, in LSD 16, 31-41-22w4, completed drilling at 5,819 ft. after opening up 19 ft. of pay zone, the lower portion of which showed a large volume of oil and small volume of gas, no water. The upper portion of D3 showed the reverse, a large volume of gas and a small volume of oil.

Perforations were carried out in the section 5,815-17 ft., with four shots per foot, and a test of those perforations was made. During the test, natural gas flowed to the surface in 15 minutes, at the rate of 300,000 cu. ft. daily, with a spray of oil-cut mud in 30 minutes and oil in 35 minutes. Crew is now completing tankage hookup preliminary to placing the well on potential test. Company officials state that the rotary rig from the discovery well will be shifted immediately ¼ mile south, for drilling at American Leduc-Bashaw 2, in LSD 9, 31-41-22w4.

The Drumheller D2 Devonian oil discovery, located about 65 miles northeast of Calgary, found sulfur water in the D3 horizon, and crew is now plugging back preparatory to running production tests in the D2. The well, owned by Dome Exploration (Western) Ltd., Western Leaseholds, Ltd., and Naco, Ltd., is Dome-Naco-Drumheller 30-14, in LSD 14, 30-29-19w4. It topped D2 productive zone around 5,420 ft., and found some 30 ft. of pay zone in that horizon. During drill-stem tests, the well indicated a potential of over 1,000 bbl. daily, with gravity of the oil in excess of 30°. The hole was carried down to 5,600 ft.

**CANADIAN WILDCAT FAILURES**

Trans Empire-Big Valley 1, LSD 8, 7-34-19w4, TD 6,020 ft.

Imperial-Little Egg Creek 1, LSD 16, 8-55-24w4, TD 5,460 ft.

Lawrence-Bay-Hanna 1, LSD 12, 34-31-15w4, TD 3,854 ft.

Pacific-Little Smoky 2, LSD 9, 1-76-22w5, TD 3,987 ft.

British Dominion-Stettler 4, LSD 4, 23-38-21w4, TD 4,437 ft.

# Mississippi

## Pellucid Bayou Field Discovery Well Completed

JACKSON.—Final completion has been made on the discovery well for Pellucid field, Adams County. R. J. Bartlett-Kemp Drilling Co. B-1 Minter, 52-5n-1w, has been potentialed for 105 bbl. of 35.2°-gravity oil daily through 9/64-in. choke. Tubing pressure was 300 psi, and casing pressure 340 psi. Production is through perforations in the Wilcox at 6,698-6,700 ft. Discovery marks the fifteenth field in Adams County.

The longest string of 7-in. casing ever set in a Mississippi well has been run in Union Producing Co.-Jones-O'Brien 1 Logan, 23-10n-3w, on the west side of Tinsley field, Yazoo County. The casing was set at 14,059 ft. in sidetracked hole. This well had top of Smackover at 14,040 ft. in original hole and blew out while coring at 14,167 ft. Drill pipe was stuck and was cemented in the hole to stop the blow. Permanent whipstock was set at 12,864 ft. and sidetracked to 14,071 ft. before pipe was run. Operators are now waiting on cement before coring into the zone from which the well blew out.

The new Glazier field discovery well in Perry County, Union Producing Co. A-1 B. M. Stevens, 19-4n-9w, has been tested on pump, but the amount of production has not increased. The well has been pump-

PITT CHEM

COAL TAR PIPELINE ENAMELS

★ Easy to Apply
★ Easy to Handle
★ Immediately Available

STANDARD GRADE
For service in temperature ranges from 32° to 120° F.

MODIFIED GRADE
For service in temperature ranges from 0° to 140° F.

PLASTICIZED GRADE
For service in temperature ranges from −20° to 160° F.

W&D 3770

OFFICES:
NEW YORK CHICAGO
ST. LOUIS TULSA
HOUSTON
LOS ANGELES
SAN FRANCISCO

Protective Coatings Division
PITTSBURGH
COKE & CHEMICAL CO.
GRANT BUILDING • PITTSBURGH 19, PA.

WHEN IT'S
*Special* BOLTS
*and* STUDS

Send your Specifications to

ERIE

37 years' experience in making special bolts, studs, nuts for specific job requirements.

ERIE BOLT & NUT CO.
ERIE, PA.
A SUBSIDIARY OF
Barium
STEEL CORPORATION
Strength to the Nation

REPRESENTATION IN PRINCIPAL CITIES

ing at the rate of 14 bbl. of 11.1°-gravity oil per day along with 2 per cent salt water. Production is through perforations in the upper Tuscaloosa stringer sands at 7,088-7,399 ft. It is reported that unless the rate of production increases, operators will experiment with various types of pumps.

The best oiler in West Lincoln field, as well as one of the better wells in the state for several years, is in the process of completion. Roeser & Pendleton-Pan Am Production Co. 1 Grice, 22-6n-6e, had approximately 18 ft. of sand from 10,665-82 ft. Casing was perforated at 10,665-82 ft. with 6 shots per foot and on drill-stem test the well flowed 580 bbl. of 41°-gravity oil daily through ¼-in. choke. Tubing pressure was 1,140 psi. with no water being encountered.

**MISSISSIPPI SUCCESSFUL WILDCAT**

Adams County: Oil discovery, "Pellucid Bayou field"—R. J. Bartlett-Kemp Drilling Co. B-1 Minter, 52-5n-1w, TD 7,014 ft., perf. Wilcox 6,698-6,700 ft., IP: 105 bbl. oil per day, 9/64-in. choke, TP 300 psi., 35.2° gravity.

**MISSISSIPPI WILDCAT FAILURES**

Adams County: John S. Callon 1 T. B. Buckles, 38-9n-3w, dry, TD 6,255 ft.

Jefferson County: Southern Production Co.-Tide Water Associated Oil Co. 1 F. Krauss & Sons, 45-8n-2e, dry, TD 6,755 ft.

Wilkinson County: Norman Germany-Kemp Drilling Co. 1 Crosby Lumber Co., 3-4n-2w, dry, TD 7,006 ft.

# Louisiana-Arkansas

## Pan-Am Tests Another Show In Fourth Prospective Zone

SHREVEPORT.—Pan-Am Southern Corp. tapped another show in the 1 Ezzell, Union County wildcat. The well, located in NE SW NE 13-17s-15w, had oil and gas shows in the Meakin, Tokio, and Travis Peak formations. The most recent one was reported in a break at 4,707 ft. in the Cotton Valley. The test is now below 5,030 ft.

In the North Shongaloo extension area, Columbia County, Stanolind Oil & Gas Co. ran 5½-in. pipe in its 2 Pine Woods Lumber Co. The well, 492 ft. north and 2,582 ft. west of the southwest corner in 10-20s-22w, is a confirmation test of production in the recently established Arkansas portion of the now two-state field. Total depth is 5,863 ft., with the producing string run to 5,841 ft. The venture found pay in the upper Pettit at 5,802-16 ft. and in the lower Pettit at 5,841-47 ft. This Webster Parish, North Louisiana, pool was extended into Arkansas by the same company's 1 Pine Woods Lumber Co., 11-20s-22w, last May. A mile to the north of the No. 2 well, McAlester Fuel Co. is rigging up its A-1 Pine Woods, 3-20s-22w, as a 6,000-ft. test.

In Franklin County, Arkansas Louisiana Gas Co. is down to about 2,000 ft. at its 1 L. D. Morris. The well (330 ft. south and east of center) 24-9n-29w, is an attempt to extend production in the Cecil area. Proposed depth is 5,200 ft.

**North Louisiana.**—Kenilworth Oil Corp. will drill its first wildcat in the state in Red River Parish. The well, 1 Long Bell Lumber Co., 990 ft. from south line and 1,690 ft. east from the southwest corner of 23-13n-8w, is scheduled to go to 3,500 ft.

Natural Gas & Oil Corp. has spotted its third Wilcox test 1,450 ft. north and 1,180 ft. east of the southeast corner of 35-12n-1e, Winn Parish. The venture will be 3 Urania Lumber Co.

In Webster Parish, Skelly Oil Co. is drilling in the Cotton Valley below 7,310 ft. at the 1 Steward. The wildcat is located 466 ft. from south and west lines of SW 19-19n-10w.

Sohio Petroleum Co. 1 Merritt is in the Travis Peak around 7,116 ft. This exploratory well is located 571 ft. south and 534 ft. west of the northeast corner of 24-17n-7w, Bienville Parish.

**NORTH LOUISIANA WILDCAT FAILURES**

Concordia Parish: Gulf Refining and Placid Oil 2 York, C SW NW 10-1n-8e, dry, TD 8,515 ft.

Baird 1 Calvert, C SW NW 25-7n-7e, dry, TD 6,515 ft.

Stewart and Halsey 1 Maxwell, 36-3n-8e, dry, TD 8,519 ft.

**ARKANSAS SUCCESSFUL WILDCAT**

Union County: Kinard 1 Bishop, SE SE SE 14-18s-17w, 150 bbl. oil from 6,683-86 ft., TD 7,707 ft., new pay in E. Schuler.

**ARKANSAS WILDCAT FAILURES**

Lafayette County: Magale 1 Griffin, SE SW NE 16-15s-24w, dry, TD 7,000 ft.

Nevada County: McAlester Fuel Co. A-1 Drake, 13-14s-21w, dry, TD 3,307 ft.

Burnett Drilling A-1 Warmack, 31-14s-21w, dry, TD 4,012 ft.

# Illinois-Ind.-Ky.

## McClosky Pool Indicated In Hamilton County Test

A NEW producing area located 3 miles west of Norris City and 2 miles southeast of the Dale-Hoodville Consolidated pool in Hamilton County, Illinois, appears to have been discovered by Carter Oil Co. The prospective discovery well, 1 Van Winkle, NE NE SW 27-6s-7e, found good saturation in McClosky lime, and in a drill-stem test at 3,277-82 ft. flowed clean oil. Tester was open 2 hours and oil was at the surface within 100 minutes. Gas started flowing in 7 minutes. Hole was deepened 18 ft. to 3,330 ft. where another test was scheduled to be made taking in the bottom 15 ft.

C. L. McMahon and associates have indications of production in Rosiclare lime at their 1 Ball, NE SW SW 36-5s-9e, a wildcat located 3 miles south of Carmi in White County, Illinois. The zone was logged at 3,144-52 ft., and after hole was deepened to 3,270 ft., 5½-in. casing was run to 3,215 ft. for testing. A drill-stem, open 2 hours and taking in an interval at 3,140-52 ft., got gas in 7 minutes and filled 1,380 ft. with clean oil, 210 ft. with mud-cut oil, and 150 ft. with salty mud and water. The location, southeast of the Carmi pool and north of the Storms pool, is ¾ mile from production.

V. R. Gallagher 1 Smith, NW NW SW 18-1s-14w, ½ mile east of the Bone Gap pool, Edwards County, Illinois, is showing for a good well in Waltersburg sand, a new pay zone for the area. The prospective pay, in which a 60-minute drill-stem test yielded 500 ft. of clean oil and 10 ft. of oil-cut mud, was logged at 2,310-30 ft. Since the test, hole has been drilled to 3,190 ft. without further commercial shows. Hole has been plugged back to the Waltersburg pay and casing run to the top for completion.

**Al W. Cherry** is completing his 1 Lutz, NW NW SW 13-4s-11w, southern Gibson County, Indiana, to open a new pool in the Haubstadt area. At latest report the well was pumping and flowing at the rate of approximately 300 bbl. per day. Pay zone is Aux Vases sand at 2,290-99 ft. with bottom of the casing at 2,288 ft. The location is just north of the Vanderburgh County line, about 12 miles north of Evansville, and is about 2 miles from nearest production.

The new Southeast Monroe City pool, located 1½ miles southeast of the Monroe City townsite, Knox County, Indiana, has its second well, confirming the discovery 2 weeks ago by Jack W. McClurg and associates at their 1 Louis Mize. The new well, Ivan White 1 Black, Militia Donation 230-2n-8w, less than 1,000 ft. north of the dis-

(Continued on page 155)

# EQUIPMENT MEN . . . in the News

## Lucey Names Carey To Managerial Post

F. E. Bernsen, president, Lucey Products Corp., Tulsa, has announced the appointment of Thomas F. Carey, Jr., as assistant general manager. Carey will also continue his duties as treasurer. He became affiliated with Lucey Products in June 1949.

Joseph E. Day has been named assistant to William G. Rudd, manager of sales. Day joined Lucey Products in 1946 as city salesman.

## De Laval Announces Executive Promotions

The following executive promotions have been announced by the board of directors of De Laval Steam Turbine Co., Trenton, N. J.:

James P. Stewart, executive vice president, named president; Wencel A. Neumann, Jr., elected vice president of industrial sales and will be responsible for the industrial and commercial sales of De Laval steam turbines, pumps, blowers, and compressors, IMO rotary pumps and power transmission equipment. H. G. Bauer, elected vice president of engineering; and Charles A. Jurgensen, elected vice president of manufacturing. He will continue to serve as works manager.

*J. P. STEWART*

*W. A. NEUMANN*

## Anderson Names Three to Head Purifier Development

Bruce R. Wright, John T. Odbert, and Michael J. Toth, engineering executives, have joined the steam-specialty division of V. D. Anderson Co., according to Carl W. Zies, president. These engineers are heading development work on new high efficiency purifiers, both internal and line types.

Wright, for 12 years prior to joining Anderson, specialized in the development and special application of high-efficiency purifiers, practiced as a consulting mechanical engineer for 20 years, and was at one time a staff engineer with Trundle Engineering Co.

Odbert has had over 20 years of broad engineering experience, specializing for the past 11 years in fluid dynamics and application of purifiers.

Toth has 10 years' engineering experience, 4 of which were as assistant to the chief engineer of a purifier manufacturer.

## Halliburton Executives Named at Annual Meeting

At the annual stockholders and board of directors meeting of Halliburton Oil Well Cementing Co., W. R. McClendon, president, announced the appointment of two executive officers: R. G. Kelly as regional vice president, and G. D. McEnroe, as assistant treasurer.

Kelly joined Halliburton in 1930 at Odessa, Tex. Assignments followed at Hobbs, N. M.; Shreveport, where he became manager of Halliburton's North Louisiana division; Midland, Tex., as West Texas-New Mexico division manager; and Duncan, Okla., as regional manager for the central region. Kelly will continue to supervise Halliburton's California, West Texas-New Mexico, Central Texas, Dallas, and north Louisiana divisions.

McEnroe began his Halliburton career in 1940 as a tax accountant, and was tax-department supervisor before his recent appointment.

Other Halliburton officers reelected were: L. B. Meaders, vice president in charge of field operations; L. D. Campbell, vice president and secretary-treasurer; Fred R. Whitten, vice president for the northern region; Harry P. Conroy, vice president for the southern region; Ralph R. Emery, vice president for foreign operations; Wilfred Tapper, vice president for electrical well services; W. D. Owsley, vice president for engineering advice to management; J. Grover Kilgore, vice president for sales and advertising; Hugh H. Leonard, assistant secretary-treasurer; and John P. Harbin, assistant secretary.

*New Halliburton officers are: R. G. Kelly, vice president, central region; and G. D. McEnroe, assistant treasurer.*

## Mayo Moved Up By Southern Geophysical

H. B. Mayo of Southern Geophysical Co., has been advanced to supervisor classification, according to Dr. Sidon Harris, president.

*H. B. MAYO*

Mayo has geen with Southern Geophysical seismic service crews throughout the Southwest for the past 6 years and is now based in the Fort Worth office. He has received responsible advancements including surveyor, computer, and party chief since joining Southern Geophysical in 1945.

## Mumford Named Manager of Worthington Turbine Sales

*W. C. MUMFORD*

W. Clifford Mumford has been appointed manager of the vertical-turbine-pump-sales division of Worthington Pump & Machinery Corp., according to an announcement by W. H. Feldman, vice president. Mumford joined Worthington in 1938 at the Holyoke, Mass., works, and advanced from positions in the machine shops and erection department.

Fenmore E. Dunn, formerly consulting sales engineer, has been named assistant manager of the same division. Dunn has been associated with Worthington since June 1950. He was formerly chief engineer of A. D. Cooke Co., Lawrenceburg, Ind.

## New Glitsch Plant to Serve Canadian Refiners

Fritz W. Glitsch & Sons, Dallas manufacturer of refinery towers, trays, and tower internals, announces the establishment of Fritz W. Glitsch & Sons, Canada, Ltd., to manufacture Glitsch "truss-type" trays for the convenience of Canadian refiners.

The new plant is located at Uxbridge, Ont., near Toronto. The entire shop personnel is Canadian. All engineering and technical supervision will be done by the home office in Dallas.

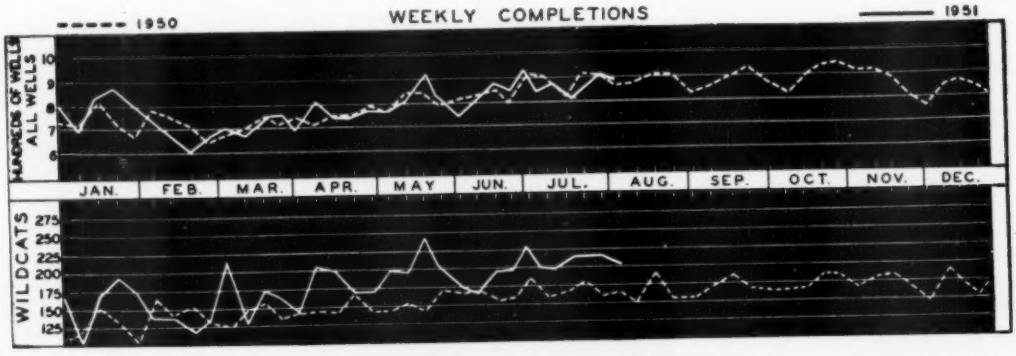
# CURRENT STATISTICS

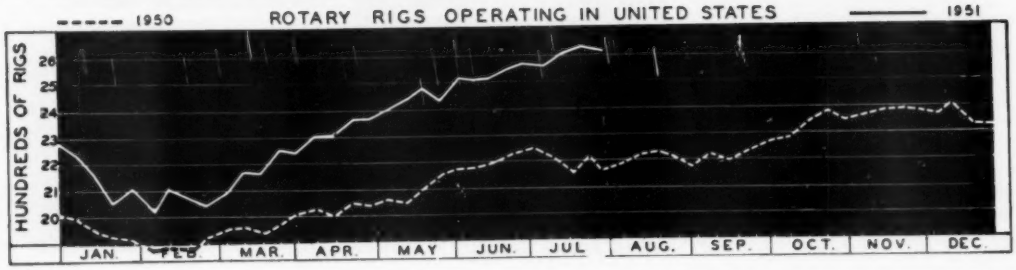
## EXPLORATION

### WEEKLY WELL COMPLETIONS . . . . WEEK ENDED AUGUST 4, 1951

| | Total of all wells | | | | | Aug. 4 | | Wildcat completions and discoveries | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Cumulative total, 1951 | | | | |
| | Comp. | Oil | Gas | Dry | Footage | 1951 | 1950 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 11 | 6 | 0 | *5 | 16,101 | 288 | 296 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pennsylvania | 14 | 7 | 1 | †6 | 23,487 | 424 | 552 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| West Virginia | 8 | 0 | 6 | 2 | 23,518 | 329 | 388 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 11 |
| Ohio | 32 | 11 | 7 | ‡14 | 56,408 | 532 | 586 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 15 | 20 |
| Indiana | 23 | 5 | 0 | 18 | 44,097 | 687 | 895 | 1 | 0 | 0 | 6 | 7 | 23 | 0 | 1 | 176 | 200 |
| Kentucky | 28 | 11 | 2 | 15 | 44,880 | 666 | 592 | 1 | 0 | 0 | 0 | 1 | 14 | 0 | 1 | 102 | 117 |
| Illinois | 59 | 18 | 0 | 41 | 191,169 | 1,259 | 1,580 | 3 | 0 | 0 | 20 | 23 | 38 | 0 | 0 | 293 | 331 |
| Michigan | 16 | 5 | 0 | ‡11 | 28,824 | 448 | 524 | 0 | 0 | 0 | 4 | 4 | 15 | 0 | 6 | 175 | 196 |
| Kansas | 91 | 52 | 7 | §32 | 295,639 | 2,503 | 2,154 | 7 | 0 | 0 | 14 | 21 | 127 | 0 | 11 | 504 | 642 |
| Nebraska | 5 | 1 | 0 | 4 | 20,084 | 144 | 61 | 0 | 0 | 0 | 4 | 4 | 4 | 0 | 1 | 66 | 71 |
| Oklahoma | 101 | 57 | 4 | *40 | 345,621 | 3,247 | 3,182 | 4 | 0 | 0 | 9 | 13 | 113 | 2 | 15 | 414 | 544 |
| Texas | 366 | 215 | 27 | 124 | 1,696,024 | 9,795 | 9,579 | 15 | 0 | 3 | 77 | 95 | 429 | 36 | 75 | 1,965 | 2,505 |
| North Central (Dist. 7-B & 9) | 107 | 51 | 2 | §54 | 373,743 | 2,982 | 2,972 | 9 | 0 | 1 | 33 | 43 | 214 | 2 | 10 | 843 | 1,069 |
| West (Dist. 7-C & 8) | 112 | 89 | 1 | 22 | 602,195 | 2,956 | 2,813 | 2 | 0 | 0 | 13 | 15 | 95 | 9 | 5 | 373 | 482 |
| Panhandle (Dist. 10) | 23 | 7 | 15 | 1 | 68,299 | 410 | 550 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 14 | 16 |
| Eastern (Dist. 5 & 6) | 25 | 19 | 0 | 6 | 120,265 | 717 | 672 | 0 | 0 | 0 | 4 | 4 | 6 | 4 | 0 | 131 | 141 |
| Gulf Coast (Dist. 2 & 3) | 43 | 27 | 3 | 13 | 260,435 | 1,371 | 1,335 | 0 | 0 | 2 | 9 | 11 | 57 | 14 | 39 | 281 | 391 |
| Southwest (Dist. 1 & 4) | 56 | 22 | 6 | 28 | 271,087 | 1,359 | 1,237 | 4 | 0 | 0 | 18 | 22 | 55 | 7 | 21 | 323 | 406 |
| Louisiana | 43 | 21 | 5 | 17 | 262,489 | 1,201 | 1,451 | 1 | 0 | 1 | 5 | 7 | 26 | 4 | 5 | 153 | 188 |
| Northern | 22 | 10 | 3 | 9 | 61,475 | 623 | 759 | 0 | 0 | 0 | 3 | 3 | 7 | 0 | 3 | 86 | 96 |
| Southern | 21 | 11 | 2 | 8 | 201,014 | 578 | 692 | 1 | 0 | 1 | 2 | 4 | 19 | 4 | 2 | 67 | 92 |
| Arkansas | 9 | 5 | 0 | 4 | 32,026 | 227 | 242 | 1 | 0 | 0 | 3 | 4 | 9 | 0 | 2 | 45 | 56 |
| Mississippi | 12 | 4 | 0 | 8 | 69,332 | 197 | 189 | 3 | 0 | 0 | 5 | 8 | 10 | 3 | 0 | 68 | 81 |
| Southeastern States | 0 | 0 | 0 | 0 | 0 | 38 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 |
| Montana | 1 | 0 | 0 | 1 | 5,400 | 126 | 115 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 28 | 28 |
| Wyoming | 13 | 9 | 0 | 4 | 63,278 | 425 | 335 | 0 | 0 | 0 | 2 | 2 | 7 | 0 | 0 | 56 | 63 |
| Colorado-Utah | 1 | 0 | 0 | 1 | 5,108 | 154 | 52 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 4 | 77 | 86 |
| New Mexico | 14 | 8 | 4 | 2 | 39,224 | 403 | 369 | 0 | 0 | 0 | 1 | 1 | 10 | 0 | 7 | 47 | 64 |
| California | 46 | 37 | 1 | 8 | 175,711 | 1,305 | 1,040 | 0 | 0 | 0 | 8 | 8 | 31 | 0 | 1 | 256 | 288 |
| Miscellaneous (Md.) | 3 | 0 | 1 | 2 | 13,048 | 33 | 9 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 19 | 13 | 32 |
| Total United States | 896 | 472 | 65 | 359 | 3,452,536 | 24,431 | 24,228 | 36 | 0 | 5 | 161 | 202 | 862 | 45 | 158 | 4,473 | 5,538 |
| Total previous week | 916 | 482 | 50 | 384 | 3,643,187 | | | 26 | 3 | 2 | 186 | 217 | 826 | 45 | 153 | 4,312 | 5,336 |
| Total August 4, 1950 | 866 | 464 | 54 | 348 | 3,191,241 | | | 25 | 4 | 2 | 138 | 169 | 632 | 47 | 114 | 3,650 | 4,443 |

Service wells included: *5, †6, ‡4, §1.



## DAILY AVERAGE PRODUCTION FOR WEEK

| | Aug. 4 crude oil | B. of M. Aug. demand | July 28 crude oil |
|---|---|---|---|
| Alabama | 3,050 | 2,400 | 2,950 |
| Arkansas | 76,750 | 85,000 | 76,850 |
| California | 979,200 | 980,000 | 978,600 |
| Colorado | 71,800 | 80,000 | 72,100 |
| Eastern | 58,500 | 64,000 | 60,000 |
| Florida | 1,825 | 1,600 | 1,725 |
| Illinois | 164,900 | 165,000 | 169,400 |
| Indiana | 32,500 | 29,000 | 30,000 |
| Kansas | 310,300 | 320,000 | 331,150 |
| Kentucky | 30,400 | 29,000 | 30,300 |
| Louisiana | 611,500 | 671,000 | 612,475 |
| North Louisiana | 114,700 | | 114,900 |
| South Louisiana | 496,800 | | 497,575 |
| Michigan | 39,500 | 42,000 | 40,100 |
| Mississippi | 100,250 | 104,000 | 100,500 |
| Montana | 23,400 | 24,000 | 23,300 |
| Nebraska | 6,400 | 10,000 | 6,250 |
| New Mexico | 147,200 | 154,000 | 147,125 |
| Oklahoma | 508,750 | 530,000 | 506,750 |
| Texas | 2,760,675 | 2,690,000 | 2,744,750 |
| Dist. 1 (Southwest) | 33,350 | | 33,050 |
| Dist. 4 (Southwest) | 255,825 | | 253,275 |
| Dist. 2 (Gulf Coast) | 160,950 | | 160,625 |
| Dist. 3 (Gulf Coast) | 472,775 | | 470,825 |
| Dist. 5 (Eastern) | 55,250 | | 54,625 |
| Dist. 6 (Eastern) | 115,675 | | 115,800 |
| East Texas field | 271,300 | | 271,300 |
| Dist. 7-C (West) | 102,975 | | 101,100 |
| Dist. 8 (West) | 965,025 | | 957,000 |
| Dist. 7-B (W. Central) | 81,900 | | 81,875 |
| Dist. 9 (N. Central) | 159,000 | | 157,750 |
| Dist. 10 (Panhandle) | 86,650 | | 87,525 |
| Utah | 4,100 | 5,000 | 4,000 |
| Wyoming | 195,200 | 178,000 | 194,600 |
| Total United States | *6,126,200 | 6,164,000 | 6,132,925 |
| Change from prev. week, down | 6,725 | | |
| Canada | 145,110 | | 165,105 |

Total U. S. production January 1-August 4 ..... †1,284,932,665 bbl.
Same period last year (crude plus cond.) ..... 1,109,743,340 bbl.

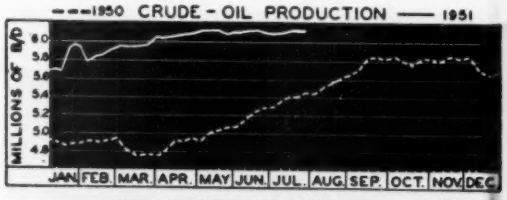
*Not including 100,265 bbl. condensate. †Including 22,844,185 bbl. condensate.

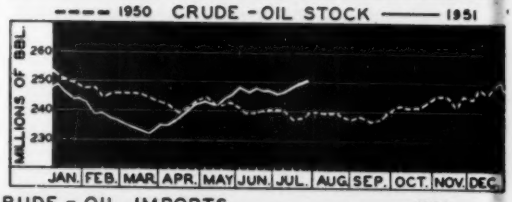
## CRUDE-OIL STOCKS BY STATES OF ORIGIN*

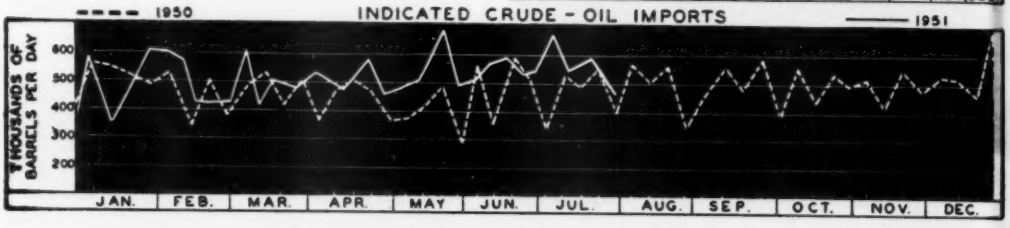
(Thousands of barrels)

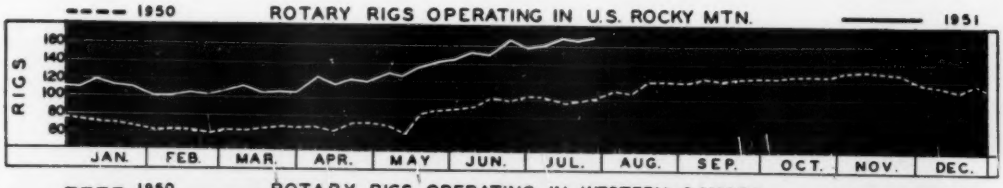
| | July 28, 1951 | July 21, 1951 | July 29, 1950 |
|---|---|---|---|
| Pennsylvania Grade | 2,110 | 2,135 | 2,775 |
| Other Appalachian | 1,416 | 1,461 | 1,581 |
| Illinois, Indiana, Michigan | 10,793 | 10,830 | 9,429 |
| Arkansas | 2,928 | 2,936 | 2,758 |
| Louisiana | 14,287 | 13,954 | 14,885 |
| North | 2,762 | 2,691 | 3,489 |
| Gulf | 11,525 | 11,263 | 11,396 |
| Mississippi | 2,966 | 2,933 | 2,275 |
| New Mexico | 6,426 | 6,327 | 5,863 |
| Oklahoma and Kansas | 38,121 | 38,033 | 32,994 |
| Texas | 119,472 | 116,413 | 115,156 |
| East Texas | 14,362 | 13,775 | 15,658 |
| West Texas | 50,773 | 47,715 | 43,484 |
| Texas Gulf | 26,484 | 27,284 | 27,213 |
| Other Texas | 27,853 | 27,639 | 28,801 |
| Rocky Mountain | 13,896 | 14,027 | 11,861 |
| California | 30,594 | 30,904 | 34,476 |
| Foreign | 8,094 | 9,059 | 6,183 |
| Total | 251,103 | 249,012 | 240,236 |

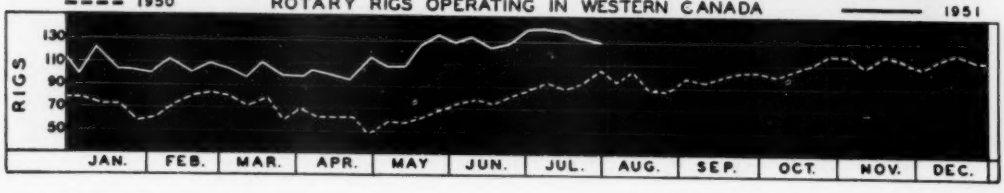
*Bureau of Mines.



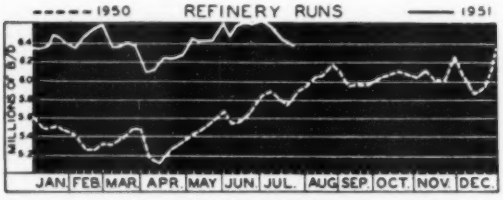



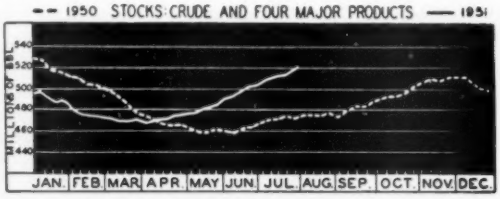
## A.P.I. REFINERY REPORT, JULY 28

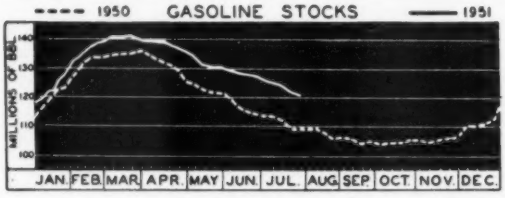
(Thousands of barrels)

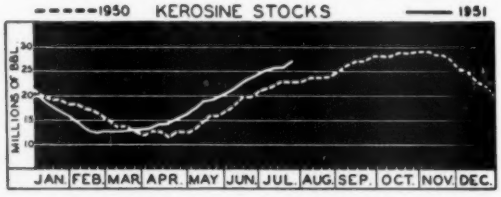
| District | Daily avg. crude runs | Daily average production | | | | Stocks at refineries, bulk terminals, in transit and in pipe lines | | | | Bureau of Mines, July 1950 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gasoline* | Kerosine | Distillate | Residual | Gasoline† | Kerosine | Distillate | Residual | Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual |
| East Coast | 993 | 414.1 | 41.2 | 184.6 | 215.0 | 26,430 | 10,310 | 23,434 | 11,439 | 964 | 402.1 | 34.3 | 192.9 | 213.7 |
| Appalachian: | | | | | | | | | | | | | | |
| District 1 | 103 | 42.3 | 4.3 | 14.3 | 12.1 | 2,846 | 610 | 998 | 403 | 98 | 44.6 | 5.1 | 12.7 | 10.2 |
| District 2 | 81 | 41.4 | 4.1 | 8.6 | 15.4 | 1,304 | 340 | 377 | 286 | 71 | 32.8 | 3.1 | 8.3 | 14.3 |
| Ind., Ill., Ky. | 1,165 | 631.4 | 66.0 | 182.1 | 168.9 | 26,769 | 5,821 | 16,744 | 5,005 | 1,090 | 585.6 | 53.2 | 159.8 | 144.8 |
| Okla., Kans., Mo. | 445 | 244.1 | 17.6 | 84.5 | 48.7 | 13,690 | 1,594 | 9,003 | 1,784 | 522 | 284.9 | 16.2 | 106.2 | 54.7 |
| Inland Texas | 261 | 164.0 | 18.6 | 43.3 | 44.1 | 3,500 | 503 | 1,308 | 1,020 | 214 | 137.2 | 10.8 | 30.2 | 42.3 |
| Texas Gulf Coast | 1,552 | 740.4 | 107.4 | 339.0 | 260.0 | 17,893 | 4,499 | 10,026 | 4,888 | 1,267 | 595.0 | 100.3 | 245.1 | 229.8 |
| La. Gulf Coast | 526 | 236.9 | 77.0 | 107.0 | 57.9 | 6,383 | 2,066 | 4,023 | 1,817 | 487 | 227.9 | 47.9 | 105.1 | 58.5 |
| N. La. and Ark. | 81 | 32.4 | 7.1 | 18.6 | 8.4 | 2,608 | 432 | 828 | 129 | 74 | 28.4 | 6.9 | 13.9 | 12.3 |
| Rocky Mountain: | | | | | | | | | | | | | | |
| New Mexico | 13 | 7.7 | | 2.7 | 3.6 | 127 | | 63 | 30 | 14 | 7.4 | .3 | 2.2 | 3.6 |
| Other Rocky Mtn. | 231 | 108.4 | 4.0 | 44.1 | 46.7 | 5,023 | 330 | 1,685 | 1,266 | 196 | 85.3 | 5.0 | 38.2 | 35.6 |
| California | 945 | 413.9 | 15.6 | 138.9 | 384.6 | 14,583 | 454 | 8,449 | 16,800 | 885 | 403.4 | 10.2 | 125.8 | 320.1 |
| July 28, 1951 | 6,396 | 3,077.0 | 362.9 | 1,167.7 | 1,265.4 | 121,156 | 26,959 | 76,938 | 44,957 | 5,882 | 2,834.6 | 293.3 | 1,040.4 | 1,139.9 |
| July 21, 1951 | 6,406 | 3,051.9 | 353.9 | 1,245.9 | 1,280.4 | 122,104 | 26,402 | 74,696 | 44,146 | | | | | |
| July 29, 1950 | 5,870 | 2,854.4 | 327.6 | 1,038.0 | 1,124.3 | 109,206 | 23,352 | 61,437 | 42,253 | | | | | |

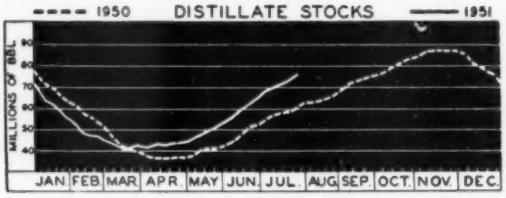
*At refineries including natural blended. †Finished and unfinished

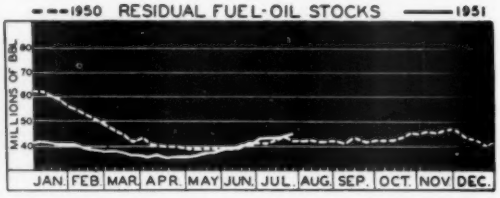


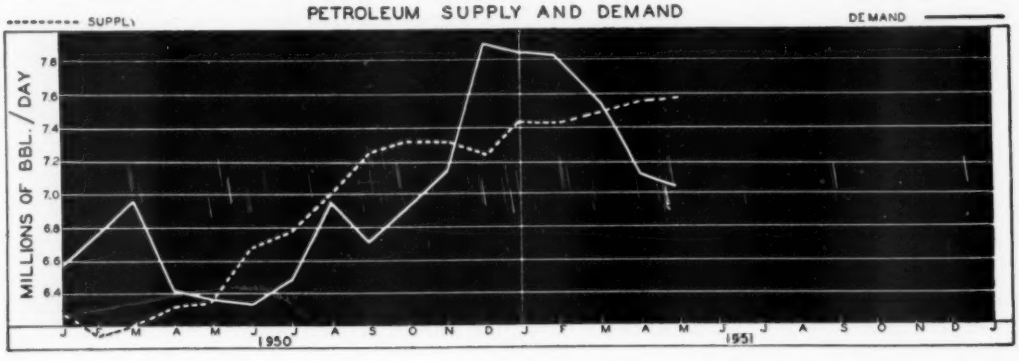



## CRUDE PRICES GRAVITY SCHEDULE

| | Signal Hill, Calif.‡ | Oklahoma, Kansas | Gulf Coast Tex.* | West Tex.† |
|---|---|---|---|---|
| 18-18.9 | $1.93 | | | |
| 19-19.9 | 1.98 | | | |
| 20-20.9 | 2.03 | $2.25 | | $2.12 |
| 21-21.9 | 2.07 | 2.27 | | 2.14 |
| 22-22.9 | 2.12 | 2.29 | | 2.16 |
| 23-23.9 | 2.18 | 2.31 | | 2.18 |
| 24-24.9 | 2.24 | 2.33 | $2.56 | 2.20 |
| 25-25.9 | 2.30 | 2.35 | 2.58 | 2.22 |
| 26-26.9 | 2.36 | 2.37 | 2.60 | 2.24 |
| 27-27.9 | 2.41 | 2.39 | 2.62 | 2.26 |
| 28-28.9 | 2.46 | 2.41 | 2.64 | 2.28 |
| 29-29.9 | 2.52 | 2.43 | 2.66 | 2.30 |
| 30-30.9 | 2.57 | 2.45 | 2.68 | 2.32 |
| 31-31.9 | 2.62 | 2.47 | 2.70 | 2.34 |
| 32-32.9 | 2.68 | 2.49 | 2.72 | 2.36 |
| 33-33.9 | | 2.51 | 2.74 | 2.38 |
| 34-34.9 | | 2.53 | 2.76 | 2.40 |
| 35-35.9 | | 2.55 | 2.78 | 2.42 |
| 36-36.9 | | 2.57 | 2.80 | 2.44 |
| 37-37.9 | | 2.59 | 2.82 | 2.46 |
| 38-38.9 | | 2.61 | 2.84 | 2.48 |
| 39-39.9 | | 2.63 | 2.86 | 2.50 |
| 40 and above | | 2.65 | 2.88 | 2.52 |

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6 1947.

‡Standard Oil Co. of California.

## FLAT CRUDE PRICES

Representative posted schedules per barrel.

| | |
|---|---|
| East Texas† | $2.63 |
| Kettleman Hills, California* | 2.90 |
| Beauregard Parish | 2.60 |
| Illinois Basin | 2.77 |
| Pecos County, Texas (Yates) | 2.35 |
| Bradford, Pennsylvania | 4.25 |
| Eastern Ill. and Western Ind.† | 2.77 |
| Tomball, Texas Gulf Coast | 2.83 |

*37°-37.9°. †35° and above.

THE stocks situation is now at a critical point, and refiners and marketers are watching it closely for clues to future activity in supply and demand for major petroleum products. Withdrawals of gasoline from primary stocks, while increasing, have been disappointingly small.

In terms of days' supply, gasoline stocks are not excessive when compared with other years; but they total so large that some refiners may lack space for increasing stocks of kerosine and distillate. With the motoring season now at its peak, refinery runs normally would be shifting more toward the burning oils.

However, the high level of stocks of both crude and products is not a cause of major concern and is not weakening the market noticeably. For the most part the stocks are in strong hands, being held by major companies who can afford to carry them and who prefer to do so as insurance against any possible contingency, such as a sudden increase in military demand or a major disruption in the world supply situation.

Continuation of the Iranian shutdown would prove the worth of this insurance. Already this is reflected in a drop in imports of distillate and residual fuel oils. Major companies now have government approval of a plan for supplying foreign markets normally served by the Abadan refinery, and this could result in a sizable rundown of United States stocks of all major products during the next several weeks.

The fact that gasoline consumption this summer is somewhat lower than the tremendous levels anticipated is having its effect chiefly on the smaller inland refineries which depend mainly on local markets. However, their surplus supplies are moving into other markets in an orderly manner, and no one expects this situation to be reflected in a break in prices during the remainder of the motoring and harvest seasons.

## REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of August 6, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

### GASOLINE, KEROSINE, AND FUEL OILS

| | Mid-Continent Group 3 | New York Harbor (barge) | Texas Gulf Coast |
|---|---|---|---|
| Regular gasoline, 80-82 octane | $10^{1}/_{4}$-$10^{1}/_{2}$ | 12-12.75 | $10^{3}/_{4}$-11 |
| Premium gasoline, 86-88 octane | $11^{1}/_{4}$-$11^{1}/_{2}$ | 13.5-13.75 | $11^{3}/_{4}$-12 |
| 42-44 w.w. kerosine | 9-$9^{3}/_{8}$ | 10 | 9 |
| No. 2 straw fuel oil | 8-$8^{3}/_{8}$ | 9 | 8 |
| No. 6 residual | $1.75-1.80 | $2.45-2.60 | $1.75-1.90 |

### NATURAL GASOLINE

| | Group 3 | North Texas | N. La. |
|---|---|---|---|
| Grade 26-70 | $5^{1}/_{2}$ | 5 | $5^{1}/_{4}$ |
| Grade 18-55 | 6.6 | 6.1 | 6.35 |

### LUBRICATING OILS

**South Texas**

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 13-13.5 |
| 750 vis., No. 3-4 neutral | 16 |
| 2,000 No. 5-6 neutral | 18-19 |

### LUBRICATING OILS

**Mid-Continent**

| | |
|---|---|
| 150-160 vis., D bright stock, 0-10 pp. | 29-30 |
| 200 vis., No. 3 neutral, 0-10 pp. | 17.5-18.5 |

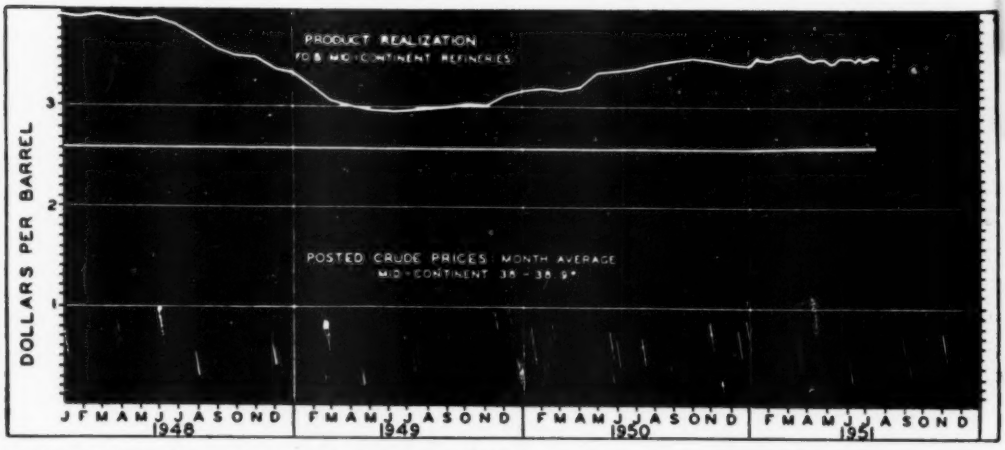
**Western Pennsylvania**

| | |
|---|---|
| 145-155 vis., 10 p.t. bright stock | 32.5 |
| 180 vis., 0 p.t. neutral | 31.5 |

### WAX

**Mid-Continent**

| | |
|---|---|
| 132-134 A.M.P. | 6.6 |


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
J F M A M J J A S O N D
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
1950
J F M A M J J A S O N D
1951

*In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.51 for week ended July 28, $3.54 for previous week, and $3.43 for July 1950.*

# CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

**DISPLAY CLASSIFIED**
$12.00 a column inch one issue . . .
10% Discount three or more issues.

**UNDISPLAYED CLASSIFIED** 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

## EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

**FOR SALE: One drilling rig complete including 127′ Lee C. Moore mast and 7,200′ of 4½″ drill pipe. Rig capacity 7,500 ft. Now operating in Oklahoma. All equipment A-1 mechanical condition. For further details and inspection write Box E-132, The Oil and Gas Journal, Tulsa, Oklahoma.**

SLIP ROLLS, 8″ diameter, 6′ long, ½″ material, 10 HP slipring motor. Bargain. McLaughlin, 3506 West Pikes Peak, Colorado Springs, Colo.

**FOR SALE:** R. L. Cardwell with **GAK** Waukesha, 1st class condition, $5,000. One super model Wilson single drum servicing unit, 80 hp. Waukesha, 4,000′ wire, all tubing tools, mounted on GM 4-wheel drive truck. $3500. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

**Gaso Duplex 4½″ x 6″ Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.**

**H. H. COFFIELD**
**Attn.: W. H. ORR**
**Phones: 132—Rockdale, Texas**
**AT-3427—Houston, Texas**

## EXCEPTIONAL OFFER

Approximately 13,000 ft. 6⅝″ OD-Internal Upset End Drill Pipe, Approximately .430 Wall. Average length 25 ft.

Approximately 5,200 ft. 5⅝″ OD-Internal Upset End Pipe, Approximately .480″ Nominal Wall. 30 ft. Average Lengths—Some with Tool Joints.

Price, all or any of above, **$180.00** per net ton, as is, where is. Location: Houston

FOR QUICK SALE

**L. B. FOSTER COMPANY**
AGENTS FOR BANK OF AMERICA
**1721 Commerce Building**
**Houston, Texas** **Blackstone 3261**

## FOR SALE

**CASING AND TUBING NEW & USED**

10000′—7″ OD 20# L.W. Used Casing
10000′—5½″ O.D. 17# L.W. Used Casing
5000′—5½″ O.D. 13# L.W. Used Casing
20000′—2″ REG: L. W. R-1 Tubing
7200′—10¾″ O.D. 31.20# P.E. G.B. Line Pipe, New
10000′—5½″ O.D. 14# S. 10V R-2 Casing, Used
20000′—2″ E.U.E. 4.70 10V & 8-R Used S Tubing.

**Sabine Machine & Supply Co.**
**Kilgore, Texas**
**Phone 3094, 3095, 3436**

## EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

990 PIECES new 1″ O.D. x 16 ga. x 16′ phosphorized Admiralty, immediate delivery, market price. Process Construction Co., Inc., 20700 So. Figueroa Street, Torrance, California. Phone: Pleasant 2-6366—Pleasant 1-6660.

BARGAIN in drilling rig: Wichtex mast-pole rotary rig for sale! 4000 feet 3½″ drill pipe; 7½ x 14 pump! Diesel powered throughout! This rig in tip-top shape, ready for immediate work! Terms can be arranged. Contact: Owner, 366 Majestic Building, Fort Worth, Texas. Telephone: FA-5598.

## EQUIPMENT FOR SALE

PIPE
ALL SIZES; LINE PIPE AND CASING, TANKS, AND OILFIELD SUPPLIES. EDCO PIPE & SUPPLY CO., PHONES 933 OR 1298, DRUMRIGHT, OKLA.

BUCYRUS, Fort Worth, Wichita spudders. Franks, Longyear rotaries. Good used Equipment. Also tools, pipe, cable. Everything for well drilling. Fishing tools rented—Pressey & Son, Pueblo, Colo.

ONE New Haven Lathe. 12 feet six inches between centers. Hand cross feed. Two centers. One face plate. One independent chuck. Tool post. Gear changes. 24-inch swing. Excellent second-hand condition. Bernstein Bros. Pipe & Machinery Co., 175 South Santa Fe, Pueblo, Colorado. Phones 53—539.

# PIPE FOR SALE!

**UNUSED STANDARD BLACK LINE PIPE:**

| | | |
|---|---|---|
| 450,000′ | 1/2″ | Standard Black, Plain Ends, 21′ Lengths. |
| 25,000′ | 3/4″ | Standard Black, Plain Ends, 21′ Lengths. |
| 70,000′ | 1″ | Standard Black, Threaded & Coupled, 21′ Lengths. |
| 120,000′ | 1¼″ | Standard Black, Plain Ends, 21′ Lengths. |
| 100,000′ | 1½″ | Standard Black, Plain Ends, 21′ Lengths. |
| 85,000′ | 2″ | Standard Black, Plain Ends, 21′ Lengths. |
| 8,000′ | 2½″ | Standard Black, Threaded & Coupled, 21′ Lengths. |
| 10,000′ | 3″ | Standard Black, Plain Ends, 21′ Lengths. |
| 2,000′ | 3½″ | Standard Black, Plain Ends, 21′ Lengths. |
| 62,000′ | 4″ | (4½″ O.D.) 8.7# Welded Line Pipe, Beveled Ends, 30′-40′ Lengths. |

**UNUSED SEAMLESS STEEL TUBING, RANDOM MILL LENGTHS:**

| | | | | | | |
|---|---|---|---|---|---|---|
| 5,000′ | 1½″ | O.D. | x | Approx. | .120/.134″ | Wall, 1.85# |
| 10,000′ | 1.900″ | O.D. | x | Approx. | .390/.415″ | Wall, 6.23# |
| 15,000′ | 2″ | O.D. | x | Approx. | .130/.165″ | Wall, 3.01# |
| 6,500′ | 2¼″ | O.D. | x | Approx. | .170/.190″ | Wall, 3.89# |
| 3,000′ | 2⅜″ | O.D. | x | Approx. | .300/.375″ | Wall, 7.5# |
| 3,000′ | 2½″ | O.D. | x | Approx. | .130/.160″ | Wall, 3.72# |
| 3,000′ | 2½″ | O.D. | x | Approx. | .188/.250″ | Wall, 5.48# |
| 2,000′ | 3″ | O.D. | x | Approx. | .188″ | Wall, 5.42# |
| 2,000′ | 3″ | O.D. | x | Approx. | .200/.250″ | Wall, 7.2# |
| 5,000′ | 3″ | O.D. | x | Approx. | .270/.320″ | Wall, 8.7# |
| 13,000′ | 3″ | O.D. | x | Approx. | .300/.350″ | Wall, 9.65# |
| 4,000′ | 3¾″ | O.D. | x | Approx. | .375/.438″ | Wall, 14.5# |
| 15,000′ | 4″ | O.D. | x | Approx. | .140/.160″ | Wall, 6.4# |
| 3,000′ | 5″ | O.D. | x | Approx. | .600/.650″ | Wall, 29.2# |
| 2,000′ | 5¾″ | O.D. | x | Approx. | .370/.450″ | Wall, 23.2# |
| 700′ | 6¼″ | O.D. | x | Approx. | .170/.210″ | Wall, 13.0# |
| 1,200′ | 6¾″ | O.D. | x | Approx. | .180/.250″ | Wall, 15.2# |

**This material is excellent for welded gas or flow lines; minimum and maximum wall thicknesses available for high and low pressure work.**

**ACT NOW! PHONE OR WIRE COLLECT YOUR REQUIREMENTS TODAY**

## A. J. STRUBEL, Broker

**SIDney 1781 (Day Phone) HUDson 8152 (Night Phone) 4946 Murdoch, St. Louis, Mo.**

**EQUIPMENT FOR SALE**

CASING PULLING CONTRACTORS with Hydraulic Equipment: Experienced operators—Pull any size pipe, anywhere. Also will buy wells for salvage. GENERAL CASING PULLING CO., P.O. Box 4387, Oklahoma City. Phone 6-1335.

**SEAMLESS CASING & TUBING**

2400′ 7″ O.D. 20 lb. Grade C seamless 10V good used seamless casing
800′ 7″ O.D. 20 lb. Grade C seamless 10V good used seamless casing
3500′ 10¾″ O.D. 40½ lb. 8 round J-55 good used seamless casing
5000′ 5½″ O.D. 14 lb. H40 8 round good used seamless casing
3100′ 2½″ O.D. 6.70 lb. 8 round J55 EUE good used seamless tubing

**FRANK MORRIS & CO.**
**4245 S. Cheyenne, Tulsa, Okla.**
**Phone 2-6247**

**EQUIPMENT FOR SALE**

WELL EQUIPMENT: New and used spudders, rotaries, core drills — all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools. Everything for Well Service. Pressey & Son, Pueblo, Colorado.

DRILLING Mud. Colo. Bentonite, it swells, it jells. Few equal, none better. Send for sample. Our price saves you money. Pressey & Sons, Pueblo, Colorado.

WILSON Super Winch, 145 GKU Engine, 65 foot double pole, on Chevrolet tandem truck. Wilson Super Winch, 140 GKU Engine, 42 foot hydraulic mast, on L-10 International tandem truck. Both rigs equipped with block, hook, swivel, B.O.P., etc. Ready to work. Also two late model Chevrolet pick-up trucks. Price an application. Write W. C. Fatjo, Inc., P. O. Box 414, Lafayette, La., or call 5-6137.

FOR SALE: Seamless casing and tubing new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

**EQUIPMENT FOR SALE**

FOR SALE: Used oil barges, excellent for conversion to drilling and material barges. Write Commercial Petroleum & Transport Co., 344 Esperson Building, Houston 2, Texas.

**FOR SALE: Ideal slush pump, Model C-150. Melton Supply Company, Seminole, Oklahoma.**

502 FEET 10-inch seamless casing, like new, 40 pound, 8 V threads. $5.00 foot. Near Tulsa. 1208 E. 20th St., Tulsa. Phone 3-9232.

FOR SALE OR TRADE: 954′ of 5½″ O.D. 13# L. W. casing—new; 3,000′ of 6⅝″ O.D.—13# L.W. casing—#1 used; 500′ of 8⅝″ O.D.—24# L.W. casing—#1 and 2 used. All above is range 1. I want new 2″—4.6# seamless tubing, preferably range 1. Prefer to trade, but will consider cash offer, subject to inspection and loading at yard near Colony, Kansas. Box E-279, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Near Madison, Kansas: 1—4½″ x 12″ Goulds Figure 1585 Vertical Triplex Pump, Serial #37834, Gear Ratio 3.67:1, Capacity of 3360 BPD at 40 RPM, suitable for waterflood. $500.00. Cities Service Pipe Line Company, Patridge, Bartlesville, Oklahoma.

FOR SALE: 85 HP Direct Driven Ingersoll-Rand Compressor Diesel and Gas heads—used one year 8000 gal. storage coils steel building complete. F. Arthur Johnson, National Transit Bldg., Oil City, Pa.

FOR SALE: One String of Cable Drilling Tools complete with Casing and Derricks. Contact H. H. Blair, 600 Bitting Building, Wichita, Kansas. Telephone #7-3241.

# CASING—TUBING

2500′ of 7″ OD, 17#, 8rd. thrd., R-2, used SS casing.

5000′ of 5½″ OD, 15.5#, 8rd. thrd., J-55 R-2, new SS casing.

12,000′ of 4½″ OD, R-2, used SS drill pipe casing, new 8rd. thrds, and new J-55 regular casing couplings, hydrostatically tested 2500#.

5,000′ of 4½″ OD, used SS drill pipe, beveled for welding.

4100′ of 2⅞″ OD, 6.50#, 8rd. thrd., EUE, R-2, used SS tubing.

12,000′ of 2⅜″ OD, 4.60#, 11½V thrd., 25′ lengths, regular used SS tubing.

**BROWN PIPE & MACHINERY CO.**
**P.O. Box 2368, Phone 3-9391, Corpus Christi, Texas**

# FOR SALE

## NATURAL GASOLINE PLANT AND 50-MILE PIPE LINE GATHERING SYSTEM

Plant operated until July 19, 1951—Formerly belonging to Engle Petroleum, Inc., at Benton, Illinois.

PLANT GAS CAPACITY—5,000,000 cu. ft. per day
PLANT PRODUCT CAPACITY—20,000 gallons per day

Pipe line gathering system (approximate):

| | |
|---|---|
| 2″ Pipe | 147,397 ft. |
| 2½″ Pipe | 9,930 ft. |
| 3″ Pipe | 9,476 ft. |
| 4″ Pipe | 50,228 ft. |
| 6″ Pipe | 5,870 ft. |
| 7″ Pipe | 10,146 ft. |
| 8″ Pipe | 38,036 ft. |
| 10″ Pipe | 2,160 ft. |
| 12″ Pipe | 212 ft. |

Interested parties 'phone, wire, or write Norman Strauss. We own these properties and can give immediate possession.

**BROWN-STRAUSS CORPORATION**

**1546 Guinotte** **'Phone Ha. 1000** **P.O. Box 78**
**Kansas City 10, Missouri**

## FOR SALE
**CASING AND TUBING**

40,000′ #1 Used H-40, J-55 and Grade C 2⅜″ O.D., 4.60# Seamless 8 R.T. & 10 V.T., R.2.
**Make Us an Offer**
2,500′ #1 Used H-40 7″ O.D., 17# Seamless 8 R.T., R.1.
**Priced to Sell**
4,000′ #1 Used J-55 5½″ O.D., 14# Seamless 8 R.T., R.2.
Several lots of 5½″, 6⅝″, 7″ #1 Lapweld Casing
**Attractively Priced**

**MICHIGAN CARLON PIPE CO.**
**20050 Livernois Ave., Detroit 21, Michigan**
**DIamond 1-1400**

## PIPE THREADING MACHINES

3—#8 Oster Rapiduction, 2½″ to 8″, 1942
2—6″ Landis, 2½″ to 6″, Late
1—8″ Landis, M/D, Late
1—2″ Landis, Late
1—#316 Oster, 1¼″ to 6″
1—#304 Oster, 1″ to 4″

**O'Brien Machinery Co.**
**Div. A, 1545 N. Delaware Avenue**
**Philadelphia 25, Pa. GArfield 6-1150**

## FUEL OIL TANKS

Two 55,000 gal. capacity
One 80,000 gal. capacity
One 20,000 gal. capacity
Two 50,000 gal. water tanks on tower

**RIVETED CONSTRUCTION**
**GOOD CONDITION**

**Write—Wire—Phone**

SONKEN-GALAMBA corporation
Riverview at 2nd Street
Kansas City 18, Kansas Thatcher 7243

X-746

### EQUIPMENT FOR SALE

FOR SALE: One Bucyrus-Erie 36 L Spudder three and one-half years old. Complete top to bottom tools 15½ to 5½. Also complete tailing in tools. All in first-class condition. List on request. J. E. Griggs, 310 East Third St., Mt. Carmel, Illinois. Phone 959.

FOR SALE: 1—1947 Model GMC Diesel Tandem 65 Tulsa Winch air equipped. 20-foot body, 12" Roller, 1100 x 22 tires, is good truck in top shape. Too large for this field. McCall & Sebastian, Drumright, Oklahoma.

2—Allis-Chalmers 12" x 12" type SE centrifugal all bronze pumps, 2500 GPM, 20' head 860 RPM. Direct connected to 2—15HP Allis-Chalmers explosion proof motors, 3 phase, 60 cycle, 220 and 440 volts, 860 RPM. Newman's Inc., 700 S. Maybell, Tulsa, Oklahoma. Phone 2-5228 or L. D. 635.

"OIL and Gas Leasing on the Public Domain" by Lewis Edwin Hoffman is a text book dealing extensively with research on Federal laws, forms, regulations and practices. Available at $7 each, exclusively through F. H. Gower, 321 First Natl. Bank Bldg., Denver, Colo.

CABLE RIG 6,000' Waukesha motor, Ensign carburetor on tandem, winch truck, Tonkawa, Oklahoma. Bargain $3,500.00. McLaughlin, 3506 West Pikes Peak, Colorado Springs, Colo.

2,000 FT. 12" OD used plain end line pipe, ¼". Gilbert Pipe and Supply Co., P. O. Box 986, Shreveport, La.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

### EQUIPMENT WANTED

COMPRESSORS WANTED: Will buy, lease or rent portable, unitized, skid-mounted gas engine driven compressors. Total requirement 2,500,000 cu. ft. per day of natural gas. Two to four units needed. Cable Tool Drilling Co., 1444 East Hill Street, Long Beach, Calif.

EQUIPMENT WANTED: One—6" x 36' to 40' x ½" to ¾" Wall x 12 to 14 tray fractionator. Describe completely with price and location. Box 978, Levelland, Texas.

WANTED: Good used core drill capable of drilling 600 ft. of 4" hole. Must be priced reasonable. Box E-272, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED AT ONCE: Two small rotary rigs complete, about size of Failing 1500—Prefer trailer mounted. Furnish equipment list, age, location and price. 508 Continental Bldg., Dallas, Texas.

WANTED: Cable 2 MACHINE, depth 3500'. Complete with tools. Give price and location first letter. Box 198, Gorham, Kansas.

WANTED: A rotary, complete depth 6000'. Give price and location. Box 198, Gorham, Kansas.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

## WANTED

New and Used BOLTED TYPE STEEL TANKS

Also WELDED & RIVETED STEEL TANKS in all Sizes

Also New and Used STEEL CASING, TUBING & PIPE

Will Dismantle

Will pay highest prices

Please phone or wire collect

**A. GREENSPON PIPE CO., INC.**
**(In business over 74 yrs.)**
**3815 Olive St., St. Louis 8, Mo., LUcas 5851**

### HELP WANTED

AGGRESSIVE OIL EXECUTIVE — Substantial independent producing company wants aggressive, high type, responsible executive as Manager West Texas-New Mexico Division. Applicant should be under 35 years of age, 10 years experience land and geological work preferably West Texas-New Mexico area. Applicant must be equipped to find and negotiate for wildcat, undeveloped, and developed properties and leases, appraise submittals, manage present West Texas office. Excellent compensation. When replying give full details, include photograph. Our present employes not considered for this position. Box E-194, The Oil and Gas Journal, Tulsa, Oklahoma.

FIELD SUPERINTENDENT: Independent company seeks qualified petroleum engineer to take full charge of foreign wildcat operation. Responsibilities include operating one diesel rig, supervision transport and supporting activities and coordination with geophysical parties. Excellent opportunity with growing organization. Annual home leave, single quarters and living furnished. In reply give full details of experience and educational background. Reply to Box E-270, The Oil and Gas Journal, Tulsa, Oklahoma.

### HELP WANTED

SEISMOGRAPH. Excellent opportunity for experienced geophysicist with aggressive independent contract company to supervise contract crew in Texas. Salary dependent on experience. Write giving details, all replies held strictly confidential. Box E-246, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST: Junior, with minimum two years sub-surface experience, required for work in Persian Gulf area. One year contract, allowances include transportation, single housing, and subsistence. Write giving age, education, martial status, and full details of past experience to American Independent Oil Company, 111 Sutter Street, San Francisco 4, California.

**COMPTROLLER EXECUTIVE**

Position open with large independent oil producer in Houston area—only those with extensive experience need apply. Excellent opportunity. Box E-271, The Oil and Gas Journal, Tulsa, Oklahoma.

## OPPORTUNITIES FOR TECHNICAL REFINERY PERSONNEL

for

## LARGE INTERNATIONAL OIL CO.

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.

Engineers with refinery experience and also recent graduates will be considered.

**Box E-143, The Oil and Gas Journal, Tulsa, Oklahoma**

## OPPORTUNITIES
## FOR EXPERIENCED ENGINEERS

**Atomic Energy Installations**
**OAK RIDGE, TENNESSEE**
**AND PADUCAH, KENTUCKY**

DESIGN-DRAFTING — chemical plants, structures, piping, utilities, alterations.

POWER—design, testing, construction of large electrical power generation and distribution installations.

MACHINE DESIGN—jigs, fixtures, gadgets, remote control equipment.

PROCESS—chemical process and equipment design, vacuum or high-pressure systems, pilot plant operation, maintenance.

CONSTRUCTION—plant design and construction, co-ordination of procurement and installation of process equipment.

SAFETY—welding inspection, hoist and vessel inspection, fire protection.

NUCLEAR REACTORS—chemical and mechanical engineers for design, development, construction.

INSTRUMENTATION—design, development and industrial application of electronics and pneumatic instruments.

AIR-CONDITIONING — HEATING — AND VENTILATING—design, installation, maintenance of plant systems.

B.S. Degree or its equivalent minimum educational requirement.

Salary Commensurate W th Training and Experience

Give detailed information concerning experience, education, personal history, references, present salary and salary expected.

**Central Technical Personnel Office**
**Carbide and Carbon Chemicals Co.**
A Division of Union Carbide and Carbon Corporation
P. O. Box P — Oak Ridge, Tennessee

## HELP WANTED

REFINERY Office Manager and Internal Auditor for integrated Oil Company. Above average opportunity. Compensation commensurate with ability. Box E-261, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Experienced field geologist, Oklahoma and or Kansas area to work for independent out of Tulsa. Good future. State complete details: schooling, experience, and salary expected. Box E-278, The Oil and Gas Journal, Tulsa, Oklahoma.

### WANTED

Engineers and Physicists with educational background in mechanical, electrical, or electronic engineering, physics or engineering physics for research and advanced development in plant and laboratory instrumentation, geophysics, physical measurements and industrial electronics. Prefer men with five to fifteen years' experience in experimental research, design and development of instruments, intricate mechanisms, electronic apparatus, optical equipment, servomechanisms and allied fields. Positions are of immediate and permanent importance to our operations. Southwestern location in medium-sized community; excellent employee benefits. Please give age, experience, and other qualifications in reply.

**Personnel Director**
**Research and Development Dept.**

**PHILLIPS PETROLEUM CO.**
**Bartlesville, Oklahoma**

## Opportunity:
## CHEMICAL ENGINEER or GRADUATE in CHEMISTRY
### FOR CALIFORNIA

**Century old firm looking for Chemical Engineer or graduate in Chemistry with B.S. or M.S. degree (preferably with experience in petroleum refining) for technical sales. Established line of chemical products used by petroleum industries and others. Salary open, give details, education, family, experience, photo if available.**

**Reply to**
**Box E-258**
**THE OIL AND GAS JOURNAL**
**Tulsa, Oklahoma**

# PETROLEUM ENGINEER

**FOR OVERSEAS POSITION WITH LARGE OIL COMPANY**

Must be 25 to 35 years of age, graduate of recognized engineering college, with 3 years minimum intensive experience in all phases of oil field drilling, development and production.

Exceptional opportunity for single man or married man agreeable to 9 months separation period. Salary commensurate with ability and experience plus living and separation allowances and complete employee benefits. Send complete resume.

**Reply Box E-268**
**THE OIL AND GAS JOURNAL**
**Tulsa, Oklahoma**

## HELP WANTED

FOREIGN and Domestic Oil Employment Directory covering the oil industry; showing where to apply for jobs. Price $5.00 Oil Industry Mailing List, Box 2603, Tulsa, Okla.

TECHNICAL OIL WRITER with engineering degree and practical experience in drilling and petroleum engineering, problems in Gulf Coast area. Position is in Houston and preferably the applicant should already reside there. Typing ability and writing-report preparation experience essential. Reply Box E-260, The Oil and Gas Journal, Tulsa, Oklahoma.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-264, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, young mechanical, must have real writing ability. P. O. Box 2486, Kansas City 6, Missouri.

WANTED: Experienced Podbielniak operator. When applying furnish full details as to education and experience. New Mexico Asphalt and Refining Company, P. O. Box 367, Artesia, New Mexico.

MAJOR oil company has openings for graduates with engineering or physics degree with some electronics background experienced or interested in training as seismograph operator. Must be single and willing to accept foreign assignment in Venezuela, Colombia, Peru or Indonesia. Give full details of personal qualifications in first letter to P. O. Box 801, Tulsa, Oklahoma.

ASSISTANT ACCOUNTING MANAGER: Opening for Assistant Accounting Manager in independent southwestern oil company. Requires college degree in accounting or equivalent experience including work in methods and procedures. Interviews for selected applicants at company's expense. Replies handled in confidence. Write Employe Relations, Box 1051, Tulsa, Oklahoma.

CORROSION engineer, under 50, degree in electrical engineering, preferably experienced in pipe-line corrosion control. P. O. Box 2486, Kansas City 6, Missouri.

SEISMIC INTERPRETER: Permanent location in Edmonton, Alberta, Canada, interpreting records of two seismograph parties for major seismograph contracting organization. Starting salary based on experience; advancement opportunity; permanent position; employes know of this ad. Those qualified by having three or more years' experience interpreting seismograph records may apply by writing Box E-249, The Oil and Gas Journal, Tulsa, Oklahoma.

MAGNETOMETER operator, foreign work. Top salary, subsistence, family living allowance, traveling expenses. Excellent conditions and climates. Our personnel has been notified. Apply Box E-263, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN gravity-magnetic supervisor. Must be of standing in field. Top salary, subsistence, family living allowance and travel expense. Best working conditions. Our personnel has been notified. Apply Box E-262, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

## SITUATIONS WANTED

GEOLOGIST: 15 years experience in every phase of geological work, desires position with small oil company. Box E-280, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL Engineer, 4 years thorough production training with major, desires connection with Major Independent, stateside or foreign. Age 28, MS degree, and now employed. Box E-281, The Oil and Gas Journal, Tulsa, Oklahoma.

## SITUATIONS WANTED

PRODUCTION MAN NOW AVAILABLE—Experienced in: drilling; completion; flowing wells; pumping wells; workovers; saltwater disposal; secondary recovery. Box E-238, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Gas Engineer desires change in location. Registered in Texas. 22 years' experience. Familiar with all phases natural gas, gasoline plant, cycling plant, and gas transmission line work. Desire location in Southwest. Would consider foreign. Minimum salary $8000.00 Domestic, $10,000 Foreign. Box E-239 The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT oil operator with outside income, 35 years old, married to attorney, would like position foreign country with oil company or government. Speaks French, Spanish, German and Italian. Thirteen years experience in land, seismograph crew supervision, drilling, producing, and developing Texas Gulf Coast. Three years college education. Wants to get away from high tax but would not consider anything less than a two year contract. Write Box E-244, The Oil and Gas Journal, Tulsa, Oklahoma.

MANAGEMENT Engineer—Foreign refining background, performance record international oil companies engineering-operating-management refineries, pipelines, terminals, Latin America, Middle East. U. S. citizen, age 37. Box E-265, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST — Nine years experience Texas and Louisiana Gulf Coast, subsurface, surface, geophysical interpretation, managing exploration program, desires connection with independent operator or small company. Box E-267, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER-LAWYER: B.S., LL.B. degrees, registered engineer. Age 30. 5 years oil industry; 2½ years field experience, 3 years drilling and production equipment. Wants position engineering or legal or combination with oil company or independent. Box E-256, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND and Lease Man, now employed, desires change, education and experience, references. Box E-276, The Oil and Gas Journal, Tulsa, Okla.

CORROSION ENGINEER—ten years experience in the oil and gas industry desires responsible position. Will consider foreign assignment. Box E-277, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION SUPERINTENDENT with over twenty years major company experience in all phases of production and development operations including seven years engineering desires suitable connection with progressive independent producer. Box E-275, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST, total of six years experience desires change. Experience includes computing, party chief, and supervision. 36 years of age and single. Permanent assignment in Gulf Coast preferred. Details furnished upon request. Box E-274, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIGN Engineer, 20 years experience refineries, power plants, piping, structures, mechanical equipment, 5 years centrifugal pumps, age 45, married, no children, desires position South America. Box E-226, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROCHEMICAL superintendent, twenty years in all phases refining and petrochemicals, desires permanent position with independent refinery or petrochemical plant in south or southwest. All offers considered. Box E-257, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 131, Ph. No. 131, Hobbs, New Mexico.

## SITUATIONS WANTED

ATTORNEY, 6 years land department major company, specialist in drafting oil development contracts, desires change. Box E-248, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, operating as an independent, wishes to become associated with company, individual, or group on a salary-interest basis. Have been associated with the oil industry better than fifteen years in geological and geophysical exploration, development, leasing, and other phases of operation, and should be an asset to one needing an experienced man. Capable of planning program and directing operations. Interview to be arranged. Box E-245, The Oil and Gas Journal, Tulsa, Oklahoma.

FORMER Independent Oil Operator ten years, with legal education, plus eight years Wall Street experience, desires connection: raise funds exploratory well drilling from excess profits taxpayers. Box D-938, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

## WANTED

WANT CAPITAL for drilling venture in return for half interest. Have Fort Worth Spudder Type H, 2000' of good casing, 2 International trucks, and 590 acres in Rogers County, Oklahoma, Sec. 17: T-22, R15. Joe H. Brewer, Oologah, Oklahoma.

## LEASE AND DRILLING BLOCKS

WILL sell 40 acres full participating royalty under N2 of SW and SE of SW 33-19-8 Creek County adjoining Gulf Oil Corp. location, priced $40.00 an acre. C. W. Mandler Commercial Bank Bldg., Muskogee, Oklahoma.

FOR SALE: Oil and Gas Leases adjoining producing leases, also wildcat leases, drilling propositions and small producing properties; all in shallow territory. W. P. Harley, Bowling Green, Ky.

**Opportunities for Leasing More Than 100,000 Acres in Eastern North Dakota**

Will consider long term leases, 25c per acre on entire acreage. Details on request.

**J. C. HATFIELD**

**The Union Central Life Insurance Co., Box 177, Cincinnati 1, Ohio**

## LEASE AND DRILLING BLOCKS

50,000 ACRES, southwest from Jackson, Tennessee. Appraised most promising by State Geologists. Qualified driller willing to take venture after interview and inspection please write Albert Stone, The Sun, Jackson, Tennessee.

WANTED: PROVEN LEASES
Proven leases on upper Gulf Coast and East Texas wanted for drilling. Finances and casing available to develop proven leases if not too heavily loaded with bonuses or overrides. Map showing acreage, together with subsurface information, or geology, that indicates profitable oil production, together with guarantee you are able to assign acreage, if a satisfactory deal can be worked out, must be furnished. Will only deal with one person in position to make a deal, and will not entertain nebulous or fragmentary deals. Box E-215, The Oil and Gas Journal, Tulsa, Oklahoma.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

**OIL FIELDS**
**S.E. NEW MEXICO**
Active drilling operations on Major Oil Structures indicate opening of important oil fields. Our recommendations of vital interest to oil men and royalty; also lease buyers. Details on request.
**W. J. PETERMAN, Geologist**
**Portales, New Mexico**

**LEASES ROYALTIES**
**Producing and Nonproducing**
**Bought and Sold—Any Area**
**Inquiries Invited**

**B. D. BUCKLEY**
**6635 Delmar Ave., St. Louis 5, Mo.**

**Opportunities for Leasing 130,000 Acres in Central and Eastern Kansas**

Some suitable for waterflooding. Will consider long term leases on reasonable terms. Details on request.

**J. C. HATFIELD**

**The Union Central Life Insurance Co., Box 177, Cincinnati 1, Ohio**

## ROYALTIES

PRODUCING ROYALTY: 10 acres Noble County, Oklahoma, under 320 acres. 8 months average $15 per acre per month return. Six undrilled locations. Priced for immediate sale $7500. US Associates, 619½ South LaBrea, Los Angeles.

PRIVATE PARTY will invest to $200,000 cash in producing Royalties, overrides or settled production in small or large deal. Box E-236, The Oil and Gas Journal, Tulsa, Oklahoma.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

**PRODUCING ROYALTIES**
**WANTED**
**ANY AREA**

**BERN SECURITIES CO., INC.**
**111 Broadway New York 6, N. Y.**
**WOrth 4-7546**

## REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

## LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

## FINANCING

YOUR FINANCING PROBLEM can be solved at moderate cost. For details write Box E-241, The Oil and Gas Journal, Tulsa, Oklahoma.

## BUSINESS OPPORTUNITIES

NOTICE Capital Investors: I will act as your buying agent for oil and gas properties in Texas, Oklahoma, New Mexico, Montana, and Louisiana. At this time we have 42 pieces of producing oil properties for sale. Charlie Priolo, 2301 West 6th, Amarillo, Texas.

EXPERIENCED engineer seeks associate with capital to develop Western defense metal property. References exchanged. Box E-269, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Operator interested in Eastern Kansas acreage suitable for water flood, attractive proposition to party who will furnish capital and develop property. Box E-272, The Oil and Gas Journal, Tulsa, Oklahoma.

## RANCHES

YOU want the best—this is it. 565 acres on beautiful Leona river in Uvalde County, Texas. Level, deep, very fertile soil. U.S.-G.S. rates its shallow water supply one of best in U.S.A. Low cost irrigation. Raise two head of cattle per acre with year around grazing. Or raise high priced winter vegetables and three bales of cotton per acre. A scenic productive ranch with hundreds of native and budded pecan trees, very large live oaks, deer, turkey, javelina, squirrel, quail, and lots of fish. Homer Henderson, Old Pearsall Road, Uvalde, Tex.

# FOR SALE
# PROPERTY IN PARADIS OIL FIELD

**St. Charles Parish, Louisiana**

Hibernia Bank & Trust Company, in Liquidation, will receive sealed bids for certain of its interests in Paradis Oil Field involving over

**9000 ACRES**

**UNTIL 11 A.M. OF SEPTEMBER 5, 1951**

For particulars write:

**Hibernia Bank & Trust Company, in Liquidation**
**Jasper S. Brock, State Bank Commissioner**
**Thos. B. Kennair, Special Agent**
**J. Edward McGuire, Liquidator**

**405 Baronne Bldg., New Orleans, La.**

## Illinois Fields

(Continued from page 144)

covery well, swabbed 35 bbl. of oil per day natural. Pay zone is Rosiclare lime at 1,511-15 ft. The discovery well had the pay at 1,502-07 ft.

Delta Drilling Co. 1 Melton, 22-O-23, ½ mile west of the Robards pool, Henderson County, western Kentucky, flowed 1,610 bbl. of oil in the first 24 hours while testing McClosky lime at 2,512-33 ft. Flow then was choked to approximately 20 bbl. per hour. Total depth is 2,613 ft. with hole plugged back to 2,535 ft.

A new pay zone, Cypress sand, has been opened in the Little Zion pool, Ohio County, western Kentucky, where W. Briney and associates 3 Hamilton pumped 3 bbl. net oil per day. The pay, shot with 100 qt., is at 763-88 ft.

### ILLINOIS SUCCESSFUL WILDCATS

Wabash County: Robert Fortner and R. H. Compton 1 Strine, NE NW SE 12-1n-14w, IP 30 bbl., McClosky 2,875-79 ft., TD 2,927 ft.

Washington County: Collins Brothers 1 Meinert, NW NE SW 10-2s-2w, IP 100 bbl., Devonian 3,076-80 ft., TD 3,080 ft.

White County: Tuley & Carter 1 Wasem, NW NE SE 24-7s-10e, IP 126 bbl., Tar Springs 2,838-57 ft., TD 2,857 ft.

### ILLINOIS WILDCAT FAILURES

Christian County: Collins Brothers 1 Eberspacher, NW NW NE 2-11n-1e, dry, TD 2,852 ft.

C. J. Simpson 1 Machino, SE SE NW 19-11n-1e, dry, TD 2,887 ft.

Clay County: D. H. Bolin 1 Jones, SE SE NW 36-4n-6e, dry, TD 3,091 ft.

Effingham County: Stanford Oil Co. 1 Mette, NW SW SW 33-8n-7e, dry, TD 2,720 ft.

Fayette County: C. J. Simpson Drilling Co. 1 Watstrom, SW SE NW 24-8n-1w, dry, TD 1,705 ft.

F. L. Runyon 1 Brown, W½ SE SE SE 22-9n-1e, dry, TD 1,748 ft.

Hamilton County: Johnson Drilling Co., Inc., 1 Clara Duncan et al, SE SE NW 26-5s-7e, dry, TD 3,495 ft.

Ryan & Sharp 1 Carrell, NE SE SW 27-6s-5e, dry, TD 3,411 ft.

Jasper County: Sun Drilling Co. 1 Johnson, S½ SE NE 16-5n-9e, dry, TD 3,140 ft.

Jefferson County: Winmar Oil Co. 1 Sneed, SE SW NW 11-1s-3e, dry, TD 2,857 ft.

Richland County: W. C. McBride, Inc., 1 Schonert, NE NE NW 28-3n-10e, dry, TD 3,290 ft.

Don Slape 1 Taylor, NW NW SE 2-3n-14w, dry, TD 3,102 ft.

Shulman Brothers 1 Weber, SW NW NW 29-5n-9e, dry, TD 3,163 ft.

Saline County: Ralph Halbert 1 Bramlet, SW NE SE 19-8s-7e, dry, TD 2,357 ft.

Washington County: E. M. Self 1 Symons, SW NE NE 34-3s-1w, dry, TD 1,328 ft.

Wayne County: Tuley & Carter 1 Ferris, SW SW NW 34-1n-8e, dry, TD 3,115 ft.

White County: Pursuit Oil Co. 1 Hatcher, NW NW SE 4-4s-10e, dry, TD 3,300 ft.

G. C. Schoonmaker 1 Garner, SW SE SE 2-5s-10e, dry, TD 3,146 ft.

Calvert Drilling, Inc., 1 Fox-McArthy, SW SE SE 5-6s-8e, dry, TD 3,402 ft.

J. L. Crawford 1 Varner, NE SW NE 18-6s-10e, dry, TD 3,369 ft.

### INDIANA SUCCESSFUL WILDCAT

Vanderburgh County: Slagter Producing Co. 1 Chandley, SW SE SW 35-4s-10w, IP 54 bbl., Cypress 1,884-92 ft., TD 1,895 ft. (opens Elliott pool).

### INDIANA WILDCAT FAILURES

Knox County: White & Vickery 2 McLin, E½ NE NW NE 4-1s-12w, dry, TD 1,584 ft.

Perry County: Clark County Oil Research 1 Kelly, SE NE NE 25-3s-2w, dry, TD 616 ft.

Pike County: C. E. Skiles 3 Sievers, NE SE SW 22-1n-7w, dry, TD 1,055 ft.

Posey County: F. B. Drilling Co. 1 Strickland, SE NW SW 20-4s-13w, dry, TD 2,979 ft.

Vanderburgh County: Calvert Drilling, Inc., and Walter Duncan 1 Well, NW SE NW 28-5s-11w, dry, TD 2,680 ft.

Vigo County: Great Lakes Carbon Co. 1 Scotto, NW SW NE 35-10n-11w, dry, TD 2,438 ft.

### WESTERN KENTUCKY SUCCESSFUL WILDCAT

Ohio County: W. Briney et al 3 Hamilton Brothers, NE NE NE NE 8-N-32, IP 3 bbl., Cypress 763-88 ft., TD 788 ft. (opens new pay Little Zion pool).

### EASTERN KENTUCKY

ASHLAND.—In northeastern Floyd County on Johns Creek, A. V. Hoenig and Ashland Oil & Refining Co. are drilling at 1,224 ft. at 4 Lucy Fraley. Objective is the Big lime formation expected at about 1,700 ft.

In Estill County on Evans Branch, V. P. F. Co. have completed 7 and 8 Monroe Faulkner for 5 bbl. of oil daily each from the Corniferous lime at an average total depth of 900 ft. Wells are on the northwest end of Big Sinking pool.

In Pike County in Big Sandy gas field, United Fuel Gas Co. has completed 3 John Davis for 179,000 cu. ft. of gas daily from Devonian black shale at 3,115 to 3,863 ft., total depth. Test showed a rock pressure of 373 psi. in 48 hours.

# ADVERTISERS IN THIS ISSUE


Abegg & Reinhold Co. 126
Allen's Foundry & Machine Works 133
American Blower Corp. 127
American Car and Foundry Company 31
American Iron & Machine Works Co. Back Cover
American Manufacturing Co. of Texas 4
American Meter Company 10
Armco Drainage & Metal Products, Inc. 70
Axelson Manufacturing Company 114

Baker Oil Tools, Inc. 52
Bank of Toronto, The 135
Baroid Sales Division, National Lead Company 3
Bendix Aviation Corporation 35
Boston Woven Hose & Rubber Company 21
Burgess Manning Company 28
Byron Jackson Co. 140
Cable & Stine 136
Cameron Iron Works, Inc. 29
Caterpillar Tractor Co. 6
Chicago & Southern Air Lines 141
Chicago Bridge & Iron Company 69
Clark Bros. Co., Inc. 86, 87
Classified Advertising 151, 152, 153, 154
Cleveland Worm & Gear Company, The 24
Climax Engine and Pump Mfg. Co. 8
Coates Field Service, Inc. 113
Colorado Fuel and Iron Corp., Wickwire Spencer Steel Division 33
Cooper, Inc., Fred E. 122
Crose Manufacturing Co., Inc., M. J. 115
Dean Brothers Pumps, Inc. 117
Dearborn Chemical Co. 107
Dow Chemical Co., The 47
Dowell Incorporated 50
Dravo Corporation 125
Dresser Industries, Inc. 85, 119, 130, 131
Dresser Manufacturing Division 119
Drilling & Service, Inc. 142
Drilling Specialties Co. 128
Erie Bolt & Nut Co. 144
Ethyl Corporation 17, 18
Fairbanks, Morse & Co. 2
Fluor Corporation, Ltd., The 83, 124
Gates Rubber Co., The 36
Geophysical Service, Inc. 110
Goodyear Tire & Rubber Company 9
Gott Mfg. Co., H. P. 117
Grancell, I. H. 126
Guiberson Corporation 46
Gunite Concrete & Construction Co. 125
Harvey & Co., Ltd., G. A. 15
Helicoid Gage Division, American Chain & Cable Co. 98
Hinderliter Tool Co., Div., H. K. Porter Company, Inc. 48
Houston Contracting Company 113
Huey & Co., S. E. 121
Hughes Tool Co. Front Cover
IDECO, a Division of Dresser Equipment Company 85, 130, 131
International Harvester Co. 81
International Nickel Company, Inc., The 38
Iverson Supply Company 85

Jacobson Maps, E. C. 137
Jones & Laughlin Supply Co. 19

Keasbey & Mattison 25
Kinzbach Tool Co., Inc. 140
Koppers Company, Inc. 26

Lane-Wells Company 30
Layne & Bowler, Inc. 27
Le Grand, Sutcliff & Gell, Ltd. 39
Lloyd Metal Foundry Co. 120

Marlow Pumps 121
Mayo Hotel, The 125
Metallic Phosphate Products Co. 124
Middle West Coating & Supply 114
Minneapolis-Moline 105
Mission Mfg. Company 90
Moore Corporation, Lee C. 89
Murdock Tank & Mfg. Co. 136

Natasco Company, The 138
National Airoil Burner Co., The 125
National Bank of Tulsa 12
National Supply Co., The 16
Nicolet Industries, Inc. 114
Nordstrom Valve Division, Rockwell Manufacturing Company 99, 100

Oakite Products, Inc. 117
Oil Center Tool Co. 138
Oklahoma Contracting Corporation 112
Orbit Valve Company 42
Overstrom & Sons 136

Perrault Brothers 121
Petroleum Electric Power Assn. 37
Pipe Line Service Corp. 40
Pittsburgh Coke & Chemical Co. 143
Pittsburgh Plate Glass Company, Industrial Paint Division 22
Reed Roller Bit Company Inside Back Cover
Republic Rubber Division of Lee Rubber & Tire Corp. 14
Republic Steel Corporation 11
Ross Heater & Mfg. Co., Inc. 34

Saran Lined Pipe Company 47
Schlumberger Well Surveying Corp. 72
Security Engineering Co., Inc. 41
Shaffer Tool Works 134
Smith Corporation, A. O. 23
Standard Pressed Steel Co. 127
Standco Brake Lining Co. 127
Superior Iron Works & Supply Company, Inc. 7

Tapecoat Company, The 44
Taylor Instrument Companies 20
Templeton, Kenly & Co. 127
Thompson Tool Co. 132
Titanium Alloy Mfg. Division, National Lead Company 156
Trefolite Company 32
Tri-Lok Company 125
Trojan Construction Co., Inc. 113
Tulsa Crating Co. 120
United Supply & Manufacturing Co. 45
Universal Petroleum Company 5
Van Dyke Industries 136
Vapor Recovery Systems Co., The 13
Viking Pump Co. 137
Voss Co., Inc., J. H. H. 125
Walworth Co. 1, 43
Warner Lewis Company 121
Wickwire Spencer Steel Division, Colorado Fuel and Iron Corp. 33
Williamson, Inc., T. D. 118
Wright Chemical Corporation 105
Wyatt Metal & Boiler Works Inside Front Cover
Zeligson Truck and Equipment Company 118


### LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that lot 5, sec. 32, T. 20 N., R. 16 W., La. M., Louisiana, 44.21 acres within the known geologic structure of the Caddo field, undefined, Louisiana, will be offered for oil and gas leasing through competitive bidding, to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, August 29, 1951, when bids will be opened. Details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

TABLE OF CONTENTS ON PAGE 51

# For Figuring High Temperature Applications of Stainless Steel...

## ELEVATED TEMPERATURE PROPERTIES

of Type 321
Titanium Stabilized Austenitic
Chromium Nickel Steel

| | TEMP. °F | STRESS-PSI |
|---|---|---|
| Creep: 1%—10,000 hrs. | 1100 | 16,000 |
| | 1200 | 11,000 |
| | 1300 | 7,000 |
| Stress for Rupture in 1000 hrs. | 1100 | 32,000 |
| | 1200 | 21,000 |
| | 1300 | 12,000 |

## A.I.S.I. type 321

Titanium stabilized stainless steel offers many competitive advantages at a substantial saving in cost compared to other types of stabilized stainless. The excellent high temperature properties, shown here, are an example. Alloys of Titanium used in making type 321, are made at Niagara Falls from U.S. ores. This assures the user a plentiful supply of type 321 stainless steel.

TAM does not make or supply steel of any kind. But, as developers of titanium alloys such as 25% and 40% Low Carbon Ferro Titanium required in making 321, we can furnish much worthwhile data. Write our New York office.

TAM PRODUCTS
Registered U. S. Pat. Off.

*TAM is a registered trademark.

**TITANIUM ALLOY MFG. DIVISION**
NATIONAL LEAD COMPANY
Executive and Sales Office: 111 BROADWAY, NEW YORK CITY · General Offices, Works, and Research Laboratories: NIAGARA FALLS, N. Y

## Claude W. Bard, Superintendent for Garvey Petroleum, Inc., of Wichita, Kansas, says:

# "WE USE THEM 100%"

"Long life and ease of replacement are two big reasons why we have standardized on **REED** Super Shrink-Grip Tool Joints," said Mr. Bard. "I am convinced that they help us keep down drilling costs."

Above right: Easy, low-cost replacement is one reason why **REED** Super Shrink-Grip Tool Joints help operators everywhere keep down drilling costs.

**REED ROLLER BIT COMPANY**

HOUSTON 1, TEXAS

NEW YORK LONDON BUENOS AIRES

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

*Designed Right! Made Right!*

AMERICAN IRON
SLUSH PUMP
**VALVES and SEATS**

Get MORE from your pumps with these long-lasting valves and seats! They have many exclusive, field-tested features, as shown by this illustration. Both valve and seat are made from high grade alloy steel forgings, precision-machined. They're fully heat treated in our new controlled atmosphere furnace—the most advanced method of heat treating known!

AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF OILFIELD EQUIPMENT
A
OKLAHOMA CITY U.S.A.

**GO "AMERICAN" ALL THE WAY--**
**with these American Iron Pump Specialties!**

SOLD THRU SUPPLY STORES EVERYWHERE

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

160° Standpipe Gooseneck
180° Standpipe Gooseneck
Long Sweep Tee
Slush Pump Compounding Valve
Slush Pump Release Valve
Long Sweep Ell with 2" Outlet
Long Sweep Full Flow Tee
Long Sweep Ell plain 90°
Long Sweep Ell plain 45°

**AMERICAN IRON & MACHINE WORKS CO.**

OKLAHOMA CITY, OKLAHOMA • BOX 1177 • PHONE L. D. 518
DISTRICT OFFICE: HOUSTON, TEXAS
EXPORT OFFICE: 11 WEST 42ND ST., NEW YORK CITY, N. Y.

MANUFACTURERS OF DRILLING EQUIPMENT • PRODUCTION EQUIPMENT • FISHING TOOLS PUMP SPECIALTIES